PB82-257726

Asphalt Roofing Manufacturing Industry Background Information for Promulgated Standards

(U.S.) Environmental Protection Agency
Research Triangle Park, NC

Jul 82

U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-450/3-80-021b
July 1982

Air

PB82-257726

EPA

Asphalt Roofing Manufacturing Industry — Background Information for Promulgated Standards

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TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
1. REPORT NO. EPA-450/3-80-021 b	2.	3. RECIPIENT'S ACCESSION NO. PB82 257726
4. TITLE AND SUBTITLE Asphalt Roofing Manufacturing Industry - Background Information for Promulgated Standards of Performance		5. REPORT DATE July 1982
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Office of Air Quality Planning and Standards U. S. Environmental Protection Agency Research Triangle Park, North Carolina 27711		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO. 68-02-3059
12. SPONSORING AGENCY NAME AND ADDRESS Director for the Office of Air Qual. Planning & Stds. U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711		13. TYPE OF REPORT AND PERIOD COVERED Final
		14. SPONSORING AGENCY CODE EPA/200/04
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

Standards of performance for the control of emissions from asphalt processing and asphalt roofing manufacture are being promulgated under Section 111 of the Clean Air Act. This document contains: (1) a summary of all the public comments made on the proposed standards and the Administrator's responses to the comments, (2) a summary of the changes made to the standards since proposal, and (3) the final environmental impact statement, which summarizes the impacts of the standards.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Pollution Control Standards of Performance New Source Performance Standards Asphalt Processing Asphalt Roofing Manufacture Particulates	Air Pollution Control	13 b

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Unlimited	Unclassified	65
	20. SECURITY CLASS (This page) Unclassified	22. PRICE

EPA-450/3-80-021b

Asphalt Roofing Manufacturing Industry — Background Information for Promulgated Standards

Emission Standards and Engineering Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

July 1982

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1. SUMMARY

A priority list for regulation of new sources was promulgated on August 21, 1979 (44 FR 49222), and included asphalt roofing. Prior to proposal of the standards, a meeting of the National Air Pollution Control Techniques Advisory Committee was held on December 12, 1979, to discuss the Asphalt Roofing Manufacture standards recommended for proposal. The meeting was open to the public, and each attendee was given an opportunity to comment on the standards recommended for proposal. As a result of this meeting, several changes were made to the recommended standards.

On November 18, 1980, the Environmental Protection Agency (EPA) proposed standards of performance for asphalt processing and asphalt roofing manufacture (45 FR 76404) under authority of Section 111 of the Clean Air Act. Also, on November 18, 1980, EPA published an amendment to the priority list (45 FR 76427), which proposed adding asphalt processing to the source category listed as asphalt roofing. Public comments were requested on the proposed regulation and on the proposed amendment to the priority list. No comments were received on the proposed amendment to the priority list. Eighteen letters commenting on the proposed regulation were received from the following groups: asphalt roofing manufacturers; petroleum refiners; trade associations; State and Federal government offices; one consultant to the petroleum refining industry; and one individual. On May 26, 1981, EPA published an amendment to the proposed regulation (46 FR 28180). This amendment clarified that the proposed standard applied to blowing stills and asphalt storage tanks used for the processing and storage of non-roofing asphalts as well as roofing asphalts. Public comments were requested on the amendment. Three letters were received from industry. Comments received on the

proposed standards and on the amendment to the standards, along with responses to these comments, are summarized in this document and form the basis for the revisions that have been made to the standards between proposal and promulgation. Four letters referring to the proposed standard were received more than six months after the end of the public comment period, which was too late for responses to be included in this document. These letters are included in Docket A-79-39, Category IV-D. Individual docket entry numbers for the four letters are IV-D-28, IV-D-29, IV-D-30, and IV-D-33. EPA's responses, in the form of memoranda to the docket, are included in Docket A-79-39, Category IV-B. The individual entry numbers are IV-B-9 through IV-B-12.

1.1 SUMMARY OF CHANGES SINCE PROPOSAL

A number of changes have been made since proposal of these standards. One of the most significant changes was made in response to comments regarding the applicability of the proposed regulation to blowing stills and storage tanks. An amendment to the proposal (46 FR 28180) clarified that the proposed regulation for blowing stills and storage tanks included blowing and storing of nonroofing asphalts. This amendment also added the definitions for asphalt processing plants and asphalt roofing plants. These changes required that Sections 60.470, 60.471, and 60.474 be redrafted. The changes are presented in this document in Section 2.9, Asphalt Storage Tanks, and Section 2.10, Definition of Asphalt Processing.

Another significant change exempts the industry from the quarterly report requirement. Refer to Section 2.5, Monitoring Requirements, of this document for the explanation of this change.

An exemption from the visible emissions standard was added for saturators that become subject to the standards through modification. Section 60.472(a)(3) was redrafted accordingly. Refer to Section 2.6, Fugitive Emissions From Saturator Hooding, for an explanation of this change.

In acknowledgment of comments that the opacity of blowing still emissions may exceed zero percent when fuel oil is used to fire the afterburner, a provision was added to the regulation [§ 60.474(k)] that describes procedures for petitioning the Administrator to establish a different opacity limit that would be the opacity standard for the

blowing still when fuel oil is used to fire the afterburner. Section 60.472 was redrafted accordingly. Refer to Section 2.4, Opacity Standards for Stills, of this document.

Changes were made to proposed Test Method 26. Test Method 26 was redesignated Test Method 5A. The promulgated method requires that filter box temperature be maintained between 32° and 52°C (90° and 126°F), as opposed to a maximum of 52°C (126°F). Refer to Section 2.12, Proposed Reference Methods, of this document. Method 5A has been further revised to clarify that the precollector cyclone is not to be used except under specific stack conditions. Use of the glass wool filters has been eliminated as being unnecessary for sampling well controlled sources. Refer to Docket No. A-79-39-IV-B-12 for an explanation of these changes.

Another change was made to the opacity limit for storage tanks to allow periods of emissions not to exceed 15 minutes in any 24-hour period to allow the industry practice of cleaning lines to be continued. Section 60.472 of the regulation was redrafted accordingly. Refer to Section 2.9, Asphalt Storage Tanks, of this document.

1.2 SUMMARY OF IMPACTS OF THE PROMULGATED ACTION

The impacts presented in this section are based on the growth projections furnished by the industry which are the same as those published in the proposal (45 FR 76407). The percent particulate reduction and the percent increases in wastewater and energy usage are the same as those presented in the preamble to the proposed regulation. The environmental, energy, and economic impacts of the promulgated standards are summarized in Table 1-1.

1.2.1 Environmental Impacts of the Promulgated Action

In 1985 the uncontrolled particulate emissions from the new asphalt processing and asphalt roofing plants will be about 7,000 Mg/yr (7,700 tons/yr). Under a typical State Implementation Plan (SIP) regulation, the emissions would be about 3,200 Mg/yr (3,500 tons/yr). The emissions from plants controlled by the promulgated standard will be about 1,200 Mg/yr (1,300 tons/yr). This is an 83 percent reduction of uncontrolled emissions, and a reduction of about 65 percent below SIP levels. This reduction in emissions will result in a reduction of

TABLE 1-1. MATRIX OF ENVIRONMENTAL AND ECONOMIC IMPACTS OF THE PROMULGATED ACTION

Impact/action	Air	Water pollution	Solid waste	Energy	Noise	Economic	Inflationary
Proposed standard	+4xx	-1xx	-1xx	-1xx	0	-1xx	-1xx
No standard or delayed standards	0	0	0	0	0	0	0

Key

+	Beneficial action	x	Short-term impact
-	Adverse impact	xx	Long-term impact
0	No impact	xxx	Irreversible impact
1	Negligible impact		
2	Small impact		
3	Moderate impact		
4	Large impact		

ambient air concentration of particulate matter in the vicinity of asphalt roofing plants and asphalt processing units subject to the NSPS.

The promulgated standards would increase the amount of wastewater to be treated in the fifth year by 212 to 235 m^3/yr (56,000 to 62,000 gal/yr). The quality of the wastewater will be the same as the quality of the wastewater presently discharged by asphalt roofing plants. The adverse water pollution impact would be negligible.

The only solid waste generated by the control devices used in the asphalt processing and asphalt roofing industry is the saturated filter media from the high velocity air filter (HVAF). This solid waste is disposed in a landfill. The additional solid material collected under the promulgated standards will not differ chemically or physically from the material collected under a typical SIP regulation. The adverse impact from landfilling, beyond the impact under a typical SIP, will be negligible.

1.2.2 Energy Impacts of the Promulgated Action

The total increased energy consumption that will result from the promulgated standards, including the amount attributable to SIP, would be about 48,000 m^3/yr (300,000 bbl/yr) of oil in the fifth year. The energy required in excess of that required by a typical SIP regulation to control all new, modified, or reconstructed asphalt processing and asphalt roofing plants will be about 1,530 m^3/yr (9,600 bbl/yr) of oil in the fifth year. Thus, the promulgated standards will have a negligible impact on national energy consumption.

1.2.3 Cost and Economic Impact of the Promulgated Action

Compliance with the standards will result in an increase in annualized costs in this industry of about $0.62 million by 1985. Cumulative capital costs of complying with the promulgated standards for the industry as a whole will amount to about $1.3 million from 1980 through 1985. The percent product price increase for products from new and modified plants, necessary to offset costs of compliance with the promulgated standards, will range from 0.08 to 0.14 percent. If the industry must absorb all the costs for compliance with the regulation, the profit reduction would be 0.3 percent. These economic impacts are negligible.

2. SUMMARY OF PUBLIC COMMENTS

The list of commenters and their affiliations is shown in Table 2-1. Twenty-one letters were received. A summary of the comments and the responses to them are presented in this chapter under the following headings:

1. Variations in Raw Materials
2. Coverage of Regulation
3. Alternative Control Devices
4. Opacity Standard for Stills
5. Monitoring Requirements
6. Fugitive Emissions From Saturator Hooding
7. Opacity Standard for Mineral Handling
8. Gradual Implementation
9. Asphalt Storage Tanks
10. Definition of Asphalt Processing
11. Data Base for Refining/Processing Industry
12. Proposed Reference Methods
13. Continuous Blowing Stills
14. Changes in Roofing Industry Market
15. Comments on Document
16. Consideration of Location
17. Miscellaneous

2.1 VARIATIONS IN RAW MATERIALS

2.1.1 Comment: D-1

The commenter suggested that coal tars and coal tar pitches be included in the standard as raw materials since they are, and/or have been, used in the roofing manufacturing industry. Failure to include these raw materials would be selective and restrictive legislation.

TABLE 2-1. LIST OF COMMENTERS ON THE PROPOSED STANDARDS OF PERFORMANCE FOR THE ASPHALT PROCESSING AND ASPHALT ROOFING MANUFACTURE INDUSTRY

Document number[a]	Commenter and affiliation
D-1	Adam Paul Banner P.O. Box 1733 Midland, Michigan 48640
D-2	Jack D. Brady, President Anderson 2000, Inc. P.O. Box 20769 Atlanta, Georgia 30320
D-3	Sam Harris Engineering Technical Consultant Services, Inc. 2721 61st Street, N.W. Oklahoma City, Oklahoma 73112
D-4, D-24	Richard D. Snyder Executive Vice President Asphalt Roofing Manufacturing Association Suite 702 1800 Massachusetts Avenue, N.W. Washington, D.C. 20036
D-5	W. R. Meyer, Executive Director Commonwealth of Virginia State Air Pollution Control Board Room 1106 Ninth Street Office Building Richmond, Virginia 23219
D-6	Thomas R. Merlino Legal Counsel, Public Affairs Owens-Corning Fiberglas Corporation Fiberglas Tower Toledo, Ohio 43659
D-7	J. R. Coupal, Jr., President The Asphalt Institute Asphalt Institute Building College Park, Maryland 20740
D-8	Special Assistant to Assistant Secretary U.S. Department of the Interior Washington, D.C. 20240

(continued)

TABLE 2.1 (continued)

Document number[a]	Commenter and affiliation
D-9	J. J. Moon, Manager Environment and Consumer Protection Phillips Petroleum Corporation Bartlesville, Oklahoma 74004
D-10	M. J. Dougherty, Manager Environmental Control Union Oil Company of California Union Oil Center P.O. Box 7600 Los Angeles, California 90051
D-11	Joe Watkins, Manager of Manufacturing Riffe Petroleum Company P.O. Box 45860 5801 E. 41st Street Tulsa, Oklahoma 74145
D-12	John W. Drake Staff Environmental Engineer Kerr-McGee Corporation Kerr-McGee Center Oklahoma City, Oklahoma 73125
D-13, D-23	Herb Schuyten, Manager Environmental Programs Environmental Affairs Chevron U.S.A., Inc. P.O. Box 3069 San Francisco, California 94119
D-14, D-25	Richard K. Meyers, Director Division of Environmental Affairs Texaco, Inc. P.O. Box 509 Beacon, New York 12508
D-15	Hugh V. Miller, Jr. Vice President of Manufacturing Allied Materials Corporation P.O. Box 589 Stroud, Oklahoma 74079

(continued)

TABLE 2.1 (continued)

Document number[a]	Commenter and affiliation
D-16	Lecil M. Colburn Director of Environmental Affairs Jim Walter Corporation P.O. Box 22601 1500 North Dale Mabry Tampa, Florida 33622
D-17	J. G. Huddle, Coordinator Air and Water Conservation Amoco Oil Company P.O. Box 6110A 200 East Randolph Drive Chicago, Illinois 60680
D-18	Robert H. Collom, Jr. Chief Air Protection Branch Environmental Protection Division Department of Natural Resources 270 Washington Street, S.W. Atlanta, Georgia 30334

[a]These designators represent docket entry numbers for Docket OAQPS A-79-39. These docket entries are available for public inspection at:

U.S. Environmental Protection Agency
Central Docket Section (A-130)
West Tower Lobby
Gallery 1, Waterside Mall
401 M Street, S.W.
Washington, D.C. 20460

Before 1900, English pitches were used in the graphite industry, and carcinoma was a problem due to arsenic in the pitch. The commenter postulates that if unknown pitches that contain arsenic were imported and substituted for asphalt, additional problems could occur.

Response:

At the present time, there is no indication that coal tars and coal tar pitches of the type described by the commenter are being used in the roofing industry. If information becomes available that indicates that such coal tars or pitches are being used, the emissions would be evaluated, and standards could be developed for processes using those materials.

Only very limited data are available on emissions from coal tar saturators, and the EPA does not have data to determine what technology would represent best demonstrated technology for control of such compounds as arsenic, which were components of English pitches imported prior to 1900.

Failure to include coal tar saturators in the standards at this time is not spot legislation. The Administrator may distinguish among classes and types within categories of new sources for the purpose of establishing standards of performance ([Section 111(b)(2)].

2.1.2 Comment: D-4

The commenter responded to the request in the Federal Register Notice (45 FR 76414) for comments on the effects of different crude oils and the catalytic blowing of asphalt on particulate emissions. The commenter stated, "There is a substantial difference in the chemical composition of today's asphalts compared to those used in EPA test program. Not only are the asphalts not as pure, but they are being mixed continuously. Thus it is conceivable that every roofing plant in the U.S. is using a separate and distinct asphalt."

Response:

EPA recognized in the BID (Chapter 3, pp. 3-35 and 3-36) that the use of asphalt fluxes from different crude oils might influence particulate hydrocarbon emissions from blowing stills. In the discussion of the afterburner (control device) in Chapter 4 (pp. 4-17 to 4-22), it was pointed out that the destruction of hydrocarbons was dependent on the afterburner operating temperature and on the residence time of the fume

in the afterburner. A well-designed afterburner can control the emissions from the variety of asphalt fluxes that may be used. The preamble to the proposed regulation contains an evaluation of the economic feasibility of using an afterburner to control emissions from blowing stills processing asphalt fluxes different from those processed during the test program (45 FR 74610-11). The following was concluded in the preamble: "Because well-designed control equipment could achieve the proposed emission limit without adverse economic impacts, the Administrator has determined that the proposed emission limit would apply to blowing stills processing asphalt fluxes from any crude oil."

The commenter did not supply any new data or substantive information which would indicate that different crude oils would affect the ability to control particulate emissions or which would lead to reconsideration of the above stated conclusions.

2.1.3 Comment: D-24

The commenter suggests that EPA conduct a series of new tests to ascertain if the changes in the types of crude oils available now, which make these oils different from those available during data gathering, have changed the volatility, and therefore the controllability of saturator emissions. The commenter acknowledges that EPA considered the effects of different crude oils on blowing still emissions and now wants EPA to consider the effects on saturator emissions.

Response

EPA recognized and discussed in the preamble the effect of changes in currently available crude oils on the quantity of emissions from the blowing still. Effects on saturator emissions were not discussed because crude asphalts are not used directly in a saturator but are first processed in a blowing still to produce saturant asphalts with specifications established by the asphalt roofing manufacturers. In the asphalt blowing process, volatile hydrocarbons are driven off as the asphalt is processed to a specified softening point and penetration. The physical properties of the blown roofing asphalt are carefully controlled to assure a consistent product quality. Volatility differences in the crude oils should not influence emissions from the saturator because the asphalt has already been processed to drive off volatile hydrocarbons.

Therefore, EPA does not feel that a series of new tests are necessary to ascertain if the differences in currently available crude oils have affected the controllability of saturator emissions.

2.1.4 Comment: D-24

The commenter stated that:

> The asphalt roofing industry is undergoing a rapid change in the use of felts. At this time approximately 20 percent of the industry's production involves fiberglass "felts" in place of the traditional paper felts. It is predicted that this trend will continue and may result in the restriction of paper felts to a less significant market share as soon as 1985.
>
> As EPA is aware, when fiberglass is used to make asphalt shingles, the saturation step using the traditional saturator and wet looper is omitted. All of the asphalt is applied by the coater when fiberglass is used. The effect of this change is to make the Proposed NSPS for particulate emissions from the saturator obsolete before it is even final.
>
> Not only are mass figures radically different for shingles made from fiberglass, but emissions are considerably less. EPA should assess this change in industry practice in depth and determine whether it mandates a serious revision or even elimination of the standard.

Response

EPA believes that the emission reduction achievable by controlling the saturator will be significant since 80 percent of the shingles in today's market are saturated paper felt shingles. If the market conditions change significantly in the near future such that saturated paper felt shingles are only a small portion of the total production, the Agency can evaluate the impact and make an appropriate revision.

The emission limit for the saturator is specified as kilogram (kg) of particulate per megagram (Mg) of asphalt shingle produced and is based on the production of shingles with a nominal weight of 106.6 kg (235-lb) per square. The commenter may be concerned that the standard would be more difficult to achieve when fiberglass shingles are being produced because there are more fiberglass shingles per ton than there are paper felt shingles per ton. This concern is not justified. The emissions (the numerator in the emission limit) when fiberglass shingles are produced are considerably less than when paper felt shingles are being produced because two out of the three emission points are not used

in manufacturing fiberglass shingles, and the asphalt is at a lower temperature than it would be if the other two higher temperature steps were used. The masses are not "radically different" between fiberglass shingles and saturated paper felt shingles. Fiberglass shingles vary in weight per square from 93.2 kg (205-lb) to 102.3 kg (225-lb) with an average weight per square of 100 kg (220-lb). The slight difference in weight between fiberglass and felt shingles would make only a small change in the denominator. This difference could be offset by the change in the numerator (emissions). Therefore, the standard would be achievable when fiberglass shingles are produced. EPA has decided that the saturator standard will be promulgated as proposed.

2.2. COVERAGE OF REGULATION

2.2.1 Comment: D-1

The commenter said that all manufacturing industries using asphalt and/or coal tars should be covered by this regulation.

Response:

In accordance with the Clean Air Act as amended in 1977, the Administrator established a priority list that identified industries which were potential sources of significant air pollution and for which new source performance standards should be established. Asphalt roofing manufacture was identified on the priority list promulgated on August 21, 1979. A source category may include multiple plant types that employ similar processes and control technologies. For example, asphalt processing (blowing of asphalt) was added to the asphalt roofing manufacturing source category because both employ the same or similar processes. Industries that use different processes and control technologies to manufacture asphalt products would not be included in this source category. If emissions from such processes were determined to be significant, standards could be promulgated for the source category appropriate to the industry(ies).

2.3 ALTERNATIVE CONTROL DEVICES

2.3.1 Comment: D-2

The commenter stated that it would seem only reasonable for regulatory documents to recognize reduced energy consumption devices which have

been proven to give equivalent performance even though these devices have not been tested by the EPA staff. A high energy air filter system has been installed on a blowing still at a plant in California and is in compliance with the South Coast Air Quality Management District regulations.

Response:

The proposed emission standard is based on test data from an afterburner. However, the preamble (45 FR 76406) notes, "Other pollution control devices are available that may achieve the level of control required by the proposed standards. Any control technique that achieves the emission limit outlined in the proposed standards could be used to comply with the standards."

2.3.2 Comment: D-4, D-7

The commenters state that the opacity limit for stills could possibly eliminate any other equipment innovations and force the industry to utilize incinerators as the only possible control device.

Response:

As stated in Response 2.3.1 above, any control device that meets the particulate emission limit for blowing stills may be used. However, if the control device does not meet the opacity limit while meeting the particulate standard during a performance test, Section 60.11(e) of the General Provisions provides that the operator may apply for adjustment to the opacity standard for that affected facility.

2.3.3 Comment: D-6

The commenter stated that:

> With the present state of the art, asphalt manufacture utilizes an energy-intensive process. For a roofing company, energy constitutes approximately 50 percent of total manufacturing cost. Without process improvements, the energy component will likely become a greater component of manufacturing cost due to energy's expected inflation rate.
>
> There is tremendous potential for improving the efficiency of the asphalt manufacturing process. One logical approach would be to expand and upgrade certain existing blowing stills while curtailing others. Under this scenario, the gross emissions in pounds per hour for the expanded unit would increase, but the emissions per ton of finished asphalt would decrease. The end result would be a more efficient process, lower manufacturing costs, and reduced emissions.

EPA's proposed NSPS would be a major deterrent to the type of progress described above. Under the requirements of the Clean Air Act, the expansion of the one unit would be a modification of an affected facility which subjects the source to the NSPS. Thus, the company would be required to install an incinerator on the upgraded and more efficient blowing still. The capital and operating costs for an incinerator would greatly exceed the product savings expected from the process improvements. Management is reluctantly forced to continue operation of the existing, relatively inefficient units.

EPA should declare that control equipment for asphalt blowing stills have a favorable cost benefit relationship. There are other types of control equipment for blowing stills which will do a commendable job at much lower cost.

Response:

The commenter's statement that energy accounts for 50 percent of the manufacturing costs for a roofing plant refers to the ratio of energy cost to the total cost of production. The opacity standard applies to the blowing still. The blowing still and the afterburner account for only 2.5 percent of the total cost of production.

The commenter questioned the applicability of the standard if production is curtailed from some blowing stills and expanded in others. The upgraded still would not be considered a modified still (and therefore not subject to the NSPS) if the controlled mass emission rate in kilograms per hour from that still were not increased beyond the previous emission rate. However, if the controlled mass emission rate were increased, the expanded still would qualify as a modified still and would be covered by the standard.

The potential for substantial savings in energy costs would be an incentive for industry to replace process equipment, and EPA would not want to prevent such replacement. However, in this industry, the cost of controlling the new equipment to meet an NSPS, beyond the cost of compliance with SIP's, is small. That is, the model plant studies show that all the capital costs and most of the energy costs for an incinerator would be necessary to meet the State Implementation Plan (SIP) particulate and opacity standards. A new, modified, or reconstructed facility would have to meet the SIP standards if the NSPS did not exist. The cost of compliance with the NSPS above the cost of compliance with the SIP's, for a blowing still in a medium size model plant, would be $25,200 per

year. For a roofing plant producing 2,060,000 squares per year (medium size model plant), the $25,200 annualized cost would increase the production cost from $13.48 to $13.49 per square. Gross profits, at a selling price of $15.87, would decrease by 0.3 percent if this cost were not passed through. EPA determined that these impacts are reasonable and would not deter management from replacing existing units with more energy efficient units.

2.3.4 Comment: D-24

The commenter states that mist eliminator technology has gained a firm place in the emission control equipment market for saturators. This technology was not assessed by EPA in the preparation of the proposed NSPS. A mist eliminator ". . . can eliminate certain drawbacks of the other technologies in the right circumstances." The commenter believes that EPA should assess this technology before finalizing the regulation.

Response

The mist eliminator was not tested by EPA as a control device for saturator emissions during the source testing program and is not considered representative of best demonstrated technology. However, this does not preclude its use in particular circumstances. As stated in the preamble (45 FR 76406), any control device that achieves the level of control required by the proposed standard may be used. (See Comment 2.3.1.) The data contained in the test report, Stationary Source Sampling Report, dated April 1981, (Docket No. A-79-39-IV-D-024) supplied by the commenter, show that the specific mist eliminator tested did control emissions during the two tests at a level that just met the proposed standard.

2.4 OPACITY STANDARD FOR STILLS

2.4.1 Comment: D-2, D-24

Commenter (D-2) states, "The emissions from the blowing still are essentially the same as those from the asphalt saturator where trace visible emissions are allowed." Therefore, the commenter requests that visible emissions also be allowed from the still. Another commenter (D-24) suggests that the opacity limit for blowing stills be set at 20 percent, or the same as the opacity limit for the saturator.

Response:

The opacity limits set for the blowing still and the saturator are each based on the test data obtained for that particular facility. When the blowing still control device, an afterburner, was being tested, no visible emissions (zero opacity) were observed. The visible emissions data in percent opacity are in the BID, Table 4-9, p. 4-46. Three control devices [an afterburner, a high velocity air filter (HVAF), and an electrostatic precipitator (ESP)] were tested and were determined to represent the best demonstrated systems of continuous emission reduction for the saturator. While all three were meeting the proposed particulate emission limit during the tests, two of the devices exhibited visible emissions (BID, Table 4-9, p. 4-46). The opacity of emissions from the ESP varied from 0 to 18 percent; the opacity from the HVAF varied from 0 to 15 percent; and the opacity from the afterburner was always zero. Thus, the opacity standards were based on demonstrated performance during emission testing, zero percent for the blowing still and 20 percent for the saturator, to allow any of the three saturator control devices to be used.

Any control device that achieves the particulate emission limit may be used to comply with the standards. If the control device does not meet the opacity limit while meeting the particulate emission limit during a performance test, the operator may petition the Administrator to make appropriate adjustments to the opacity standard [Section 60.11(e) of the General Provisions].

2.4.2 Comment: D-3, D-12, D-15

Three commenters state that the zero opacity limit for the blowing still is too stringent and suggest a 10 percent opacity limit. With the zero limit, there would be no flexibility for incinerator operation. Excessive energy would be needed to fire the incinerator and preclude any excursions above the proposed limit. The zero percent opacity would require perfect operation of an incinerator or ESP and would require excessive maintenance and use of energy.

Response:

The opacity limit was based on test data (BID, Table 4-9, p. 4-46). Every opacity reading was zero during the 22-hour test, and the

particulate emissions from the tested afterburner were consistently below the proposed emission limit. The particulate standard and the opacity standard were based on this afterburner, which was selected as representative of the best demonstrated system of continuous emission reduction.

Reference Method 9 states, "Opacity shall be determined as an average of 24 consecutive observations recorded at 15-second intervals . . . . For each set of 24 observations, calculate the average by summing the opacity of the 24 observations and dividing this sum by 24." The method allows for excursions in opacity. If the sum of the 24 observations is less than 10 percent, the average opacity would be less than 0.5 percent, which would round to zero percent.

The amount of energy required to operate the afterburner was conservatively estimated since the heating value of the hydrocarbon in the fume was not taken into account. The cost of the required energy consumption was determined to be reasonable, as discussed in the preamble (45 FR 76410-11).

2.4.3 Comment: D-4, D-7

Two commenters state that the zero percent opacity requirement is most unreasonable, especially at startup and shutdown periods, and locks the industry into using afterburners as the only control device.

Response:

Section 60.11(c) of the General Provisions states that the opacity standards set forth in this part shall apply at all times except during periods of startup, shutdown, and malfunction. The cost and economic impact of afterburners were examined as discussed in the Federal Register (45 FR 76410-11). The impacts were judged to be reasonable. However, the industry is free to use any technology that meets the particulate emissions standard, as discussed in Response 2.3.1.

2.4.4 Comment: D-4, D-7, D-13

Two commenters (D-4, D-7) state that if plants use fuel oil instead of gas to fire the afterburner, the chances for zero opacity with current control devices are slim. "In the EPA test program, only one blow still was tested and it used an incinerator fired with natural gas."

Another commenter (D-13) stated:

> While adjustments are made in the emissions rates for afterburners, depending on fuel type and catalyst application during blowing, no adjustments were made in the opacity limit. Thus, this visual limit could effectively override the specified emissions requirements.

Response:

EPA recognizes that if fuel oil is used to fire the afterburner, a blowing still may be in compliance with the particulate standard but not be able to meet the zero opacity standard. Therefore, a provision has been added to the regulation that describes procedures to be followed if an owner or operator wants to petition the Administrator to establish a different opacity standard for the blowing still when fuel oil is used to fire the afterburner. The procedures are in accordance with Section 60.11(e) of the General Provisions. When natural gas is used to fire the afterburner, the zero percent opacity limit will apply.

2.4.5 Comment: D-13

> The commenter stated:
> The requirement for zero percent opacity for blowing stills is an excessively stringent requirement. Opacity limits for the rest of the refinery operations have been set at 20 percent. The zero percent opacity does not allow for the ±5 percent limitation in opacity measurement.

Response:

The proposed standard is based on the best demonstrated system of continuous emission reduction for asphalt blowing stills. As discussed in Response 2.4.2, the opacity limit for the blowing still can be consistently achieved at a reasonable cost. The blowing still process is a different operation from other refinery processes and, as such, would not be expected to have the same opacity limit.

Opacity in Method 9 is an average of 24 readings taken at 15-second intervals for a 6-minute period. For example, under Method 9 one reading of 10 percent or two readings of 5 percent in each 6-minute period could occur without exceeding zero percent opacity because the average of all readings would be below 0.5 percent, which would round to zero. The positive observational error associated with an average of 25 readings has been established (40 CFR 60, Appendix A, Method 9). The accuracy of the method is taken into account by enforcement agencies when determining

possible violations of opacity standards. All Method 9 opacity readings taken during the 22-hour test to develop this standard were zero percent.

2.4.6 Comment: D-13

The commenter states that opacity measurements are visual measurements of sources which are already controlled under other rules and the visual limit could effectively override the specified emissions requirements.

Response:

Opacity limits have been proposed to aid enforcement and operating personnel in determining that the emission control devices are properly maintained and operated. The use of opacity standards for this purpose is supported by Section 302(1) of the Clean Air Act, which provides for any requirement relating to the operation or maintenance of a source to assure continuous emission reduction. The use of opacity standards is further supported by Portland Cement Association v. Train, 513, F.2d 506, 508 (D.C. Cir. 1975). If a control device for a blowing still meets the emission limit during a performance test but exceeds the zero percent opacity, the owner/operator may petition the Administrator to make an adjustment to the opacity standard following the provisions of Section 60.11 of the General Provisions, and a new opacity standard may be established for that particular facility. Once an opacity standard for an affected facility is established, exceeding that opacity would constitute a violation of that standard; and such a violation could also be considered in a determination of proper operation and maintenance.

2.5 MONITORING REQUIREMENTS

2.5.1 Comment: D-4, D-7, D-13, D-15

Three commenters (D-4, D-7, D-15) stated that the requirement for continuous recording of the operating temperature and maintenance of the temperature records for 2 years would either make excessive demands on personnel or would require additional personnel. Another commenter (D-13) stated that the recordkeeping requirements are not necessary due to the quarterly reporting requirements.

Response:

EPA reviewed the recordkeeping and reporting requirements to determine if their purpose (ensuring proper operation and maintenance of

the control device) could be achieved with fewer recordkeeping and/or reporting requirements.

The temperature of the control device would be recorded automatically by an instrument onto a permanent, hard copy disc or card. Such automatic recording and subsequent storage of the cards for 2 years should not place an excessive demand on personnel, so the recordkeeping requirements are not being changed. Without this requirement, the owner/operator and the enforcement agency would have difficulty determining if proper operation and maintenance of the control device were being conducted.

The records of constant temperature monitoring, together with the opacity standards being promulgated, should provide enforcement agencies with sufficient means of ensuring that the control devices are properly maintained and operated on a continuous basis without the necessity for quarterly reports. Therefore, in an effort to reduce reporting costs, the Administrator has decided to remove the requirements for quarterly reports from the proposed regulation.

2.5.2 Comment: D-3, D-4, D-7, D-12, D-15

Two commenters (D-3, D-12) stated that constant temperature monitoring and routine reporting of the temperature profile would not be of value to the enforcement agency in determining if the emission standard has been met, and, therefore, this requirement should be eliminated.

Two commenters (D-4, D-7) disagree with the statement: "If the average temperature over any 6-hour period of operation was below that measured for incinerators or above that measured for HVAF's or ESP's, by definition excess emissions would have occurred." The commenters state that weather and operating conditions will have a major bearing on any test. An increase in emissions, if it occurred, would not necessarily be over the allowable limit.

Three commenters (D-3, D-12, D-15) stated that the standard requires testing and thereafter fixing incinerator operating parameters on a worst-case scenario. There should be some provision made to compensate for variations in feed material which affect blowing temperature, time, and emissions, and for continuous blowing.

Response:

The constant temperature monitoring requirement is based on Section 302(l) of the Act, which provides:

> The term "standard of performance" means a requirement of continuous emission reduction including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction. [Emphasis added.]

EPA believes that changes in temperature from those measured during a performance test are good indicators for an owner/operator to use to ensure good operation and maintenance. Exceeding the temperature measured during the performance test for an HVAF or ESP or not maintaining at least the temperature measured during the performance test for an afterburner could indicate a violation of the requirement to properly operate and maintain the control equipment as stated in Section 60.11(d) of the General Provisions. This Section states:

> At all times, including periods of startup, shutdown, and malfunction, owners and operators shall to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator, which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

Although periods of temperature excursions or reductions (depending on the control device) as determined by temperature measurements would not of themselves constitute a violation of the numerical emission limits, they may indicate to an enforcement agency the need to conduct a performance test. The results of the performance test would be used to determine compliance with the numerical emission limits in accordance with Section 60.11(a) of the General Provisions.

EPA acknowledges that the operating temperature of the control device is one of several parameters that determine the amount of particulate emitted and that the correlation between operating temperature and emissions is not absolute. However, it would be burdensome for the owner or operator to keep records of all parameters that influence emissions and then enter values for these parameters into a formula in

order to calculate emissions. Instead, EPA believes that the best way to demonstrate proper operation and maintenance is to monitor only temperature, which is critical to the destruction or collection of particulate hydrocarbons.

For afterburners, temperature, hydrocarbon concentration, and exposure time at temperature all influence destruction efficiency. The emission data collected during the testing program (BID Chapter 4) and other data (Docket No. A-79-39-II-I-025) used in the analyses show that if the residence time is constant, the afterburner operating temperature is critical to the efficiency of hydrocarbon destruction. For HVAF's and ESP's, the collection efficiency increases as the operating temperature decreases (BID Chapter 4).

Maintaining the operating temperature at the level which was recorded during a performance test when the numerical emission was met ensures that the control device is being operated and maintained properly. However, since EPA recognizes that the ambient temperature may affect emissions from the HVAF and ESP, a provision was made in the proposed regulation to allow plant owners or operators the option of repeating the performance test if such changes are made and thereby establish a new temperature value (45 FR 76413). Maintenance of this temperature would be required, and failure to maintain the temperature, averaged over a 6-hour period, could be considered in the determination of proper operation and maintenance of the control device.

2.5.3 Comment: D-12

The commenter stated that no provisions are made for exceptions that would justify deviations from those incinerator operating parameters established during the compliance test. An example of such exceptional conditions is a refinery where the incinerator is not dedicated to the affected blowing still (i.e., existing or nonaffected process using the incinerator) or when the affected blowing still is down and the incinerator remains in a cutback operational state.

Response:

The rationale for the selection and usefulness of temperature monitoring requirements is explained in Response 2.5.2. Compliance with the opacity and particulate standards and with the temperature monitoring

requirement is required only when the affected facility is operating. EPA does not anticipate more than one blowing still at a time operating and discharging exhaust gases to an incinerator. While an existing (nonaffected) blowing still is operating and being controlled by the incinerator, compliance is not required.

2.5.4 Comment: D-13

The commenter states that normal operating procedures require monitoring of the various operating parameters on a routine basis. This is done to maintain efficiency of the overall process. If an upset does occur, continuous monitoring will not stop this. Routine monitoring will note this and respond quickly. Furthermore, under refinery practices, all critical process data are recorded for use in maintaining efficient operations. Therefore, continuous monitoring does not appear to be cost effective, nor does it contribute to the overall efficiency of operations.

Response:

As stated in Response 2.5.2, the control device operating temperature is used to ensure proper operation and maintenance of the control device. The continuous monitoring requirement is not meant to replace routine monitoring of the process and control equipment by operating personnel. It has been determined that the operating temperature of the afterburner is critical to efficient destruction of hydrocarbon emissions. It has also been determined that the cost of the monitoring requirement (now without quarterly reporting) is reasonable (Docket No. A-79-39-IV-A-022).

2.6 FUGITIVE EMISSIONS FROM SATURATOR HOODING

2.6.1 Comment: D-4, D-6, D-7, D-17

Two commenters (D-4, D-7) stated opposition to the fugitive emission standard for saturators which limits the time that visible emission from the saturator capture system are allowed. They pointed out that the fugitive standard is not based on a scientific analysis of what is being emitted but on a judgment made by an observer.

Another commenter (D-6) said:

> The technical deficiencies of monitoring indoor fugitive emissions will be difficult to hurdle in any enforcement proceeding. Will the results vary with the lighting, building

temperature and observer position? Will the court be willing to ignore de minimis emissions from crevices of the equipment?

Another commenter (D-17) stated that the standard should be changed to no emissions in excess of zero percent opacity because heat waves can make emissions visible even though no particulate or other pollutant is present.

Response:

The proposed standard is based on the proposed Reference Method 22, which requires a determination of the presence or absence of visible emissions, not a measurement of opacity or quantity of emissions. The scientific basis for this method and the development of this method were discussed in the Federal Register (45 FR 76413 and 76422). Method 22 was developed during the testing and data gathering program for this standard and for other standards specifically to overcome the technical deficiencies of monitoring the presence of visible emissions indoors and outdoors. Method 22 requires observer training on the procedures for determining the presence of visible emissions. This training consists of the observer learning the information in the documents, referenced in Method 22, on the effects of background contrast, ambient lighting, observer position relative to lighting, the presence of uncombined water on the visibility of emissions, and the difference between heat waves and emissions. De minimis emissions from the crevices of saturator hooding should not be observed if the hooding is properly designed, installed, and operated. If the hooding is not properly designed or operated and de minimis emissions occur, these would be observed as fugitive emissions in violation of the standard if they occur more than 20 percent of the time. For the above reasons, and as previously explained in the preamble, EPA believes that the fugitive emission standard as stated is reasonable and accurate; therefore, no change is being made.

2.6.2 Comment: D-4, D-6, D-16

Commenter D-4 asks if EPA has jurisdiction over equipment within the plant when the Clean Air Act (CAA) limits EPA authority to "ambient air," a term which has been defined as measuring the atmosphere external to buildings.

Commenter D-6 stated that EPA is now asserting jurisdiction to control emissions inside a building, which is clearly the domain of OSHA.

Commenter D-16 stated that EPA is not responsible for workplace environment; Congress specifically restricted its authority to the ambient atmosphere. Therefore, the portions of the proposed subject standard regarding inplant fugitive emissions must be deleted in their entirety.

Response:

The Clean Air Act gives EPA the authority to regulate emissions from stationary sources. Section 111(3) defines a stationary source as "any building, structure, facility, or installation which emits or may emit any air pollutant." Any emissions that escape from the saturator and are not captured by the hood or enclosure would be emitted to the outside through doors, windows, and roof vents. Observation of these diffused emissions from outside the building would be extremely difficult. Therefore, the standard requires that the fugitive emissions be observed indoors at the source of the emissions.

2.6.3 Comment: D-4, D-15

Commenter D-15 stated that the fugitive emission standard is too stringent. "These emissions occur on an intermittent basis, they vary according to asphalt temperature and quality, and would require control equipment which are all high maintenance or operating cost items."

Commenter D-4 did not believe that control of fugitive emissions to the extent required by the standard has been adequately demonstrated as required by the Clean Air Act.

Response:

Section 111 of the Clean Air Act requires that standards of performance reflect "the degree of emission limitation achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emissions reduction . . .) the Administrator determines has been adequately demonstrated . . . ." The assessment of the various systems of capturing emissions from asphalt saturators is discussed in the BID (Chapter 4) and in the preamble (45 FR 76411-12). These discussions

present test data which show that the total enclosure is currently the most effective capture system for saturator emissions and that the performance of this system has been adequately demonstrated. A properly designed and operated system would be able to achieve the proposed emission standards over the full range of operating conditions (asphalt temperature and quality) that occur in a saturator. EPA therefore believes that the proposed standard is consistent with the Clean Air Act requirements and is supported by the data.

Enclosures of the type required to meet the visible emissions standard are being installed around new saturators as standard industry practice. One of the major reasons why full enclosures are being installed instead of canopy hoods is that a full enclosure significantly reduces the air flow to the control device, and therefore, the control device can be sized smaller. The capital and annualized costs of a saturator control system with a full enclosure hood are lower than the capital and annualized costs of a saturator control system with a canopy hood (Docket No. A-79-39-IV-B-14). Enclosures are also being installed as standard practice because their presence reduces the extent of damages that might occur in the event of fire (fires frequently occur in asphalt saturators) (Docket No. A-79-39-IV-E-12. When the enclosure is part of the facility construction, the enclosure/saturator "fit," or configuration, can be designed and built to minimize any technical difficulties. However, EPA recognizes that installing an enclosure around an existing saturator could present technical problems that may result, in some cases, in unreasonably high design and installation costs. At this time, there is not enough information available about the cost of retrofitting enclosures for the Agency to be certain that the costs would be reasonable in all cases. Consequently, existing saturators that become subject to the standards through modification are exempted from the visible emissions standard. This exemption does not apply to saturators that become subject to the standards through reconstruction. The five reconstructed saturators that have been projected by industry are those that will be rebuilt as a result of extensive fire damage (Docket No. A-79-39-II-E-13). Because at least 50 percent of the saturator will be rebuilt (a facility is determined to be reconstructed only if the costs are equal to or exceed 50 percent of the costs to build an

entirely new facility), the physical constraints that may be associated with an entire, existing saturator would not be present. The enclosure could be designed and installed as part of the saturator construction. The costs are not expected to be different from the costs for an enclosure on a new facility. Therefore, reconstructed saturators are not exempt from the visible emissions standard.

2.7 OPACITY STANDARD FOR MINERAL HANDLING

2.7.1 Comment: D-5, D-24

Commenter (D-5) stated that the opacity standard of 1 percent in Section 60.472(d) is totally unenforceable. According to the preamble, this standard was based on observations of visible emissions from the affected facility, using Reference Method 9, that gave readings equal to or less than 1 percent. The commenter does not think that it is possible for any human being to make such observations to the accuracy required to come up with such readings. Another commenter (D-24) states that determining 1 percent opacity is impractical and could not be met by industry. The commenter recommends that the opacity be set at 10 percent.

Response:

Opacity determination for compliance does not depend on a single reading. Method 9 states that an opacity reading is the average of 24 readings taken at 15-second intervals for 6 consecutive minutes. The 15-second readings shall be entered to the nearest 5 percent opacity. For example, it is possible to meet this requirement and still record opacities greater than zero, as long as the sum total of the 24 opacity readings is less than 35 percent. This would result in an average opacity reading of 1.4 percent, rounded off to 1 percent. The 1 percent opacity limit is enforceable and is clearly supported by the data reported in EPA 450/ 3-80-021a (see pp. 4-54, and C-54 through C-58). Therefore, the regulation is not being changed.

2.8 GRADUAL IMPLEMENTATION

2.8.1 Comment: D-4, D-7

Two commenters recommend that more consideration be given in the standards to permit greater flexibility for companies to meet the standards. It seems to the commenters that the purpose of such standards

should be to reduce emissions with "state-of-the-art" equipment to a feasible level and not to try to move to ground zero in one step. A gradual implementation will assure quick and reachable solutions within cost parameters that are possible.

Response:

EPA has developed the standards in accordance with the mandate of the Clean Air Act (CAA). The standards "reflect the degree of emission limitation achievable through application of the best adequately demonstrated technological system of continuous emission reduction, taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impacts, and energy requirements" [BID, p. 2-2, and Section 111(a) of the CAA]. The control devices on which the standard is based are used in the industry and are described in Chapter 4 of the BID. The emission limit for each affected facility has been set so that there is a margin between that limit and the highest limit achieved by the control devices tested for that facility. Since new source performance standards apply only to new sources or to those that are changed substantially enough to meet the criteria for modification or reconstruction, nationwide implementation will be gradual. The costs of purchase, installation, operation, and maintenance were evaluated for the control devices on which the emission limits are based. These costs and the associated economic impacts have been determined to be reasonable.

2.9 ASPHALT STORAGE TANKS

2.9.1 Comment: D-9, D-10

Commenter D-9 states that the definition might be misinterpreted to include tanks located at a refinery that did not process asphalt. The commenter suggested that the definition be rewritten to exclude asphalt tanks at refineries where blowing is not conducted.

Commenter D-10 states that the proposed NSPS and proposed amendment to the priority list would effect all new, modified, or reconstructed asphalt tankage, not just roofing asphalt tankage at asphalt roofing manufacturing/processing facilities. The commenter questions if EPA's BID adequately addressed the environmental and economic impact of controlling tankage for asphalts other than roofing asphalts. There is a definite implied assumption that the asphalt tankage proposed for

control are at major facilities such as asphalt roofing manufacturing plants, asphalt processing plants, or oil refineries.

Response:

All asphalt storage tanks at petroleum refineries, asphalt processing plants and asphalt roofing plants are subject to the standard. Asphalt storage tanks at refineries with blowing stills are no different from asphalt storage tanks at refineries without blowing stills. The same control technologies are applicable to storage tanks at refineries, whether or not a blowing still is present. There is no reason to exclude storage tanks at refineries that currently do not have blowing stills. The control cost per installation is the same whether the tank stores roofing or nonroofing asphalt. EPA analyzed the economic impacts of the standards and determined that the impacts were reasonable. Storage tanks at any of these three locations are included in the standards.

Information from a refiner without a blowing still indicates that uncontrolled asphalt storage tanks where asphalt is stored at temperatures below 149°C (300°F) exhibit a zero percent opacity (Docket No. A-79-39-IV-D-011). Therefore, if asphalt is stored at a relatively low temperature, the tanks may meet the proposed standard without controls.

2.9.2 Comment: D-3, D-12

The commenters stated that the zero opacity creates a safety hazard because the mist eliminator required to meet the proposed standard will plug due to the coating of asphalt. This plugging would cause a reduction of the flow of equalizing air through the tank vent and could result in explosion or implosion during filling or draining operations. The risk incurred is not justified by the miniscule reduction in air pollution occasioned by the application of mist eliminators. The zero opacity standard for asphalt storage tanks should be removed from the regulation.

Response:

The zero opacity standard for storage tanks is being promulgated because technology to achieve the zero opacity at a reasonable cost has been demonstrated and will reduce emissions from asphalt storage tanks by about 90 Mg/yr (99 tons/yr). The data on which this standard is based are presented in the BID, Chapter 4, Table 4-9, and in Appendix C, pp. C-4 and C-53. A mist eliminator would require periodic maintenance

and cleaning to ensure proper operation. A properly designed mist eliminator will not be unsafe if the required routine maintenance and cleaning procedures are followed. Any control device that can meet the zero opacity standard for storage tanks can be used.

2.9.3 Comment: D-13

The commenter stated that the need for emission controls from asphalt storage tanks is questionable. The cost effectiveness of mist eliminators on storage tanks ranges from $1,225 to $1,804 per ton of collected pollutant (BID, Table 8-46). This requirement should be deleted. The cost is significant for removal of only 1 percent of the emissions from a model facility.

Response:

The cost of pollution control for each of five regulatory options are discussed in Chapter 8 of the BID. The Administrator considered the capital costs, annualized costs, cost per ton of particulate collected ($1,225 to $1,804/ton) and the economic impacts of the cost on profit, product prices, plant closings, unemployment, and exports and determined that all the costs are reasonable for the particulate removal of 90 Mg/yr (99 tons/yr) and will not inhibit industry growth. No new information has been presented to change this assessment.

2.9.4 Comment: D-14, D-25

The commenter stated, in two separate comment letters, that the zero opacity rule for vent emissions from asphalt storage tanks is considered unreasonable, since no substantive evidence is presented to support the technical feasibility or availability of economically reasonable control equipment within the refining/processing industry. The commenter did not find test data from storage tanks or even the mention of a mist eliminator. He expected mist eliminators in continuous service to clog with baked-on oil and asphalt the same way EPA test equipment did when Method 5 was used contributing to high maintenance and replacement costs.

Response:

Mist eliminators are described on page 4-14 of the BID. On page 4-46, Table 4-9 of the BID, opacity data from asphalt storage tanks that are controlled by a mist eliminator are summarized. In Appendix C on

pages C-4 and C-53 (Table C-23), the complete data are presented. These data show that the proposed standard can be achieved by the use of mist eliminators. The mist eliminator would require periodic maintenance and cleaning for proper operation. Maintenance costs were calculated and included in the annualized costs for the model plants. These costs were considered in the Administrator's determination that the cost of achieving the standards in the proposed regulation is reasonable for asphalt processing plants, petroleum refineries, and asphalt roofing plants (see also Response 2.11.1).

2.9.5 Comment: D-17

The commenter states that the opacity limit on emissions from asphalt storage tanks should be relaxed to permit visible emissions for periods not to exceed 15 minutes in any 24-hour period. This would allow continuation of the necessary industry practice of blowing transfer lines to clear high softening point asphalt from the lines before it solidifies. Often large transfer lines in refineries are thousands of feet long, terminate at remote locations, and must be quickly cleared of asphalt to avoid plugging. At remote locations the only practical method of clearing the line is to blow the line back to the tank using nitrogen or air.

Response:

The opacity standard for asphalt storage tanks has been changed to allow the blowing back of the transfer lines. The promulgated standard allows emissions for not more than 15 consecutive minutes in any 24-hour period when the transfer lines are blown for clearing. However, the control device must not be bypassed during this 15-minute period, as stated in the regulation.

2.9.6 Comment: D-10, D-11

The commenters state that the proposed NSPS should only address roofing asphalt because of the lack of information in the BID and preamble on other types of asphalt. There is no information on emulsified asphalt, cutback asphalt, and paving asphalt. Facilities handling these commodities are totally different operations from those which process and handle roofing asphalt. Furthermore, the physical properties and emission

characteristics of emulsified asphalt, cutback asphalt, and paving asphalt are very different from roofing asphalt.

Commenter D-11 states that opacity observation tests were conducted by untrained observers on asphalt stored at 136° to 138°C (275° to 280°F) using the visual inspection method of taking 24 observations of 15 seconds each within a 6-minute period. The observers recorded zero percent opacity for all readings. He requested that EPA exempt asphalt storage tanks, which can comply with the zero opacity limit without control equipment.

Response:

Storage tanks containing cutback asphalts (asphalts mixed with solvents to reduce viscosity and thereby facilitate low temperature applications) and emulsified asphalts (asphalts finely dispersed in water with an emulsifying agent) are excluded from these standards. However, blowing and/or storage of roofing asphalts and other asphalts, whether used for paving or other nonroofing purposes, are included in the standards. These asphalts are essentially the same as roofing asphalts and the same equipment is used for oxidizing or storing either type of asphalt. If the applicability of the standards depended on the eventual use of the product, a still or storage tank could be subject to the regulation on one day (while blowing or storing roofing asphalt) but not subject to the regulation on another day (while blowing or storing nonroofing asphalt). Even if the same still or storage tank were not used for more than one type of asphalt, there could be one unit devoted to roofing asphalts and subject to the regulation while another identical unit devoted to nonroofing asphalts would not be subject to the regulation. Furthermore, to meet the increased demand for roofing asphalt, a manufacturer could increase capacity by constructing new stills or storage tanks but then limit the use of the new facilities to nonroofing asphalts while devoting a larger number of existing facilities to roofing asphalts (46 FR 28180).

The processes and control technologies are the same, and the emission limits remain achievable, whether the asphalt is to be used for roofing or nonroofing purposes. Therefore, blowing stills and storage tanks for paving and other nonroofing asphalts are included in the standards. The

definition of "asphalt storage tanks" was changed with the amendment to the proposed standards (46 FR 28180) to specifically exempt cutback and emulsified asphalts.

As stated in the preamble to the amendment (46 FR 28180), storage tanks that store asphalt at low temperatures may exhibit zero percent opacity without controls. These storage tanks would, therefore, meet the standard, and the operator would not have to install a control device as long as the zero percent opacity is maintained.

2.10 DEFINITION OF ASPHALT PROCESSING

2.10.1 Comment: D-12

The commenter states that the definition of asphalt processing is ambiguous and uncertain. The use of the term "asphalt processing plants" in the definition of the term "asphalt processing" creates an uncertainty that should be eliminated. The following is suggested: ". . . asphalt processing means the storage and air blowing of roofing asphalt at refineries and asphalt roofing manufacturing plants . . . ."

Response:

Blowing stills are located at plants which are neither a petroleum refinery nor an asphalt roofing plant. To include these plants, the term "asphalt processing plant" was used and is now defined in the standard. Asphalt may be blown for purposes other than production of asphalt roofing. The definition is not intended to specify the end use of the blown asphalt.

2.10.2 Comment: D-3

The commenter said that the definition of asphalt processing is ambiguous and should be clarified. The production of paving asphalts or roofing fluxes from vacuum tower bottoms, where no blowing is required, would be exempt from these regulations under the proposed definition.

Response:

The actual production of asphalt products from vacuum tower bottoms, where no blowing is required, is not included in the regulation. Storage tanks containing these asphalts are included in the regulation.

2.11 DATA BASE FOR REFINING/PROCESSING INDUSTRY

2.11.1 Comment: D-14,D-25

The commenter stated in two separate comment letters, that the data base for the refining/processing industry should be strengthened before final regulatory action is taken. Many of the processes, control devices, and test procedures discussed have little or no relevance to the refining/processing industry, primarily because the major emphasis of the NSPS appears to be on the roofing industry. The associated technical feasibility and cost-effective analysis are considered inadequate to support the recommended regulations for the refining/processing industry.

The use of HVAF's is considered to be impractical for refining/processing because of plugging, and the filter replacement frequency would make such a system manpower intensive. Afterburners and electrostatic precipitators require extensive collection systems, including vapor holding tanks to reduce peak loading of the control facilities during tank-charging operations. It does not appear that the cost of these facilities have been considered.

Response:

The only affected facilities at petroleum refineries and asphalt processing plants would be the blowing still and the asphalt storage tanks. The control devices that were tested and shown to be effective in controlling emissions from these processes are afterburners for the blowing still and mist eliminators for the storage tanks. These facilities and the production processes are the same as those used in the roofing industry. There is no technical reason why these controls could not be used at a refinery as well as at a roofing plant. However, the operator may use any alternate control device of his choice as long as it can achieve the emission limit.

EPA analyzed the impacts of the costs of complying with the NSPS at petroleum refineries (Docket No. A-79-39-IV-B-6 and IV-B-7). The costs of collecting and controlling the emissions from asphalt storage tanks and blowing stills were used in the impact analysis. Two model plants were developed: (1) a small size model plant producing 194,040 Mg/yr (215,360 tons/yr) of blown asphalt and (2) a large size model plant producing 251,034 Mg/yr (277,500 tons/yr) of blown asphalt. The results of

the analysis show that if all control costs were passed through, the percent price increase would be 0.5 percent for the small size model plant and 0.4 percent for the large size model plant. The return on investment (ROI) for the baseline (SIP control) plants would be about 22 percent for both plants. If the costs were absorbed by the petroleum refineries, the ROI would decrease from 22 percent to 16.4 percent for the small plant and from 22 percent to about 16.7 percent for the large plant. EPA believes that these cost impacts are reasonable.

EPA expects the petroleum industry to be able to pass through pollution control costs to the wholesale and retail markets. Since 1972 the wholesale prices of gasoline, distillate, and residual oil have increased at an annual rate of greater than 19 percent. Not all of this was due to increased costs for crude oil since profit margins rose 28 percent annually from 1978 to 1980.

2.12 PROPOSED REFERENCE METHODS

2.12.1 Comment: D-16

The commenter expressed particular concern about EPA's assessment of the impact of the proposed Method 5A (formerly Method 26) test procedures on existing facilities which may become subject to the standard through modification or reconstruction and stated that:

> The available test data on control systems on asphalt roofing facilities is based on Method 5 or locally established test procedures. No correlation of results obtained using Method 26 versus those obtained using Method 5 or any other procedure was attempted. This makes the evaluation of existing operations relative to the proposed NSPS impossible.
>
> USEPA must realize that since the proposed mass emission requirements are based on a small number of tests conducted at selected plants using Method 26, there can be at best only a small degree of confidence that the proposed emission rates will be within the performance capabilities of a variety of control systems serving facilities having an even greater variety of new material and process variables. A correlation of a new test method to past performance test procedures must be made by USEPA before the environmental impact of the NSPS can be determined. . . . USEPA should withhold promulgation of this standard and application of Method 26 until adequate correlation testing is conducted and the results made available.

Response:

During method development testing, it was determined that EPA Reference Method 5 was not adequate for measuring emissions from the affected facilities in the asphalt processing and asphalt roofing industry. As discussed in the BID (Appendix D), there were two major problems in using Method 5 for measuring emissions from asphalt. These problems were: (1) the solvent used for cleaning the test equipment would not recover all of the material collected, and (2) the collection temperature specified in Method 5, 121°C (250°F), is higher than the temperature required to condense and collect the asphalt hydrocarbon particulate. EPA developed Method 5A specifically for particulate emissions from the asphalt processing and the asphalt roofing industry. The solvent used in Method 5A is different, and the filtration temperature specified in Method 5A is 42°±10°C (108°±18°F). Because the amount of particulate collected varies with filtration temperature and the amount analyzed is affected by recovery efficiency, data from Method 5 cannot be correlated with data from Method 5A.

Test data from Method 5 were not used to establish the allowable emission level nor to assess control equipment performance. The standards are based solely on data from Method 5A. There is no need for EPA to measure emissions using Method 5.

Section 111 of the Clean Air Act requires that the standard reflect the degree of emission reduction achievable through the application of the best system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. Based on a survey of the industry, EPA believes that the high volume air filter (HVAF), the electrostatic precipitator (ESP), and the afterburner (A/B) represent the best demonstrated systems of continuous emission reduction. Emission tests were conducted at asphalt facilities in different geographical areas. All three of the control devices (HVAF, ESP, and A/B) were tested. The variations in materials, processes, and control equipment that might affect the achievability of the standard have been

discussed in the preamble (45 FR 76404) and the BID (Chapters 3, 4, 6, and 8) and were considered in setting the emission limits. The proposed standard for particulate emissions was set at a level which was demonstrated to be achievable by each of the control devices tested.

2.12.2 Comment: D-24

The commenter provided test data (Stationary Source Sampling Report, dated April 1981, Docket No. A-79-39-IV-D-024) showing a comparison between saturator emissions measured using Method 5 and Method 5A. The commenter believes the differences indicate a need to reexamine the interrelation between the proposed standard and Test Method 5A. The commenter suggests a new series of tests be conducted.

Response

EPA has reviewed the test report submitted which shows an emission level of 0.0132 lb/ton using Method 5 and 0.0822 lb/ton using Method 5A. These results demonstrate EPA's evaluation that Method 5 does not adequately collect and measure asphalt hydrocarbon particulates (see Comment 2.12.1). The standard is based on results of tests conducted using Method 5A. The standard was set at a level which was higher than each of the levels measured during the test program and is achievable using Method 5A. For these reasons, EPA does not believe that additional testing is required.

2.12.3 Comment: D-24

The commenter has conducted a saturator emission test at a modern facility (new) using a mist eliminator as the control technology. The results of the first three test runs yielded an average emission rate of 0.0822 lb/ton when test Method 5A was used. On the following day, the emissions from three test runs (Method 5A) averaged 0.061 lb/ton. The commenter believes that the results of these tests provide strong confirmatory evidence that the proposed NSPS for saturator particulate emissions will be very difficult to meet with Reference Test Method 5A.

Response

The saturator emission tests show that the tested facility just met the proposed emission limit. The standard is stated to the nearest hundredth lb/ton. For the first test the 0.0822 lb/ton (0.0411 kg/Mg) rounds down to 0.08 lb/ton (0.04 kg/Mg). Both 0.08 and 0.061 lb/ton

meet the emission limit of 0.08 lb/ton. Although the facility met the proposed limit, it should be noted that (1) the control device used, a mist eliminator, was not selected as representative of best demonstrated technology and (2) the gas stream was not cooled prior to entering the mist eliminator. The level of the standard is based on best demonstrated technology, which includes HVAF's, ESP's, and afterburners. When HVAF's or ESP's are used, the gas stream must be cooled before it enters the control device to ensure vapor condensation. When afterburners are used, the combustion temperature must be high enough to destroy hydrocarbon particulates. If best demonstrated technology is used, the standard will be achievable using Test Method 5A.

2.12.4 Comment: D-13

The commenter asks what temperature range is permissible for filter operation (Section 2.1.4). The temperature cannot exceed 52°C (Section 4.1.5); however, there are restrictions such as those in Method 5. If the air stream is water saturated, then the filter can become saturated at 52°C.

Response:

The proposed version of Method 5A did not specify a minimum temperature or a range of operating temperatures. Because the collection temperature directly affects the amount of particulate collected, EPA has decided to specify a range of filter and probe temperatures including an upper and lower limit for operation.

The probe and filter operating temperature specifications have been revised to 42°±10°C (108°±18°F). The results of EPA's emission tests show that this range of temperatures can be maintained by commercially available source sampling equipment. Maintaining this temperature range will minimize the effect of temperature changes on the amount of particulate collected.

Section 2.1.3 of Method 5A specifies the use of a precollector cyclone only if the sample gas stream is moisture saturated. The intent is to maintain the precollector cyclone at approximately the same temperature as the filter and thereby collect moisture droplets before the sample reaches the filter. The filter is thus protected from moisture saturation and should remain dry through the test run.

2.12.5 Comment: D-13

The commenter asks if the cyclone is maintained by ambient temperature (Section 4.1.3).

Response:

As noted above, the precollector cyclone is maintained at the temperature of the filter in order to collect moisture droplets condensed at that temperature and to protect the filter from moisture saturation.

2.12.6 Comment: D-13

The commenter asks if the desiccation requirement of Method 5A will be sufficient to rapidly achieve constant weight.

Response:

The EPA determined from its test program that for control system outlet samples, the criteria for constant weight defined in Method 5A, Section 4.3.1 was met for all samples between the 24- and 48-hour weighings following the solvent drying period. About one in three samples from control device inlet locations took as long as an additional 24 hours (total 72 hours) to reach constant weight following the solvent drying period. The solvent drying period duration depends on the amount of solvent in the sample. The EPA laboratory tests have shown that the solvent drying time can be decreased substantially by heating the sample to 100°F without any significant sample loss. This procedure has been added to Method 5A. The Agency feels that these sample drying and desiccation time requirements are not excessive.

2.12.7 Comment: D-13

The commenter says that Method 22, "Visual Determination of Fugitive Emissions from Material Processing Sources," requires a subjective judgment. This method does not require a trained observer. Therefore, the criteria for a visual determination depends solely on the observer. The observer should be trained regarding the effects on visibility of emissions caused by background contrast; ambient lighting; and observer position relative to lighting, wind, and condensing water vapor; however, the method does not require training. EPA used Method 9 to develop the data base for the standard. EPA proposed opacity standards. Compliance is then determined by a subjective pass/fail technique. The emission frequency could depend on the observer's visual acuity. The requirements

for positioning of the observer (5.1) coupled with the interference determination (5.4.3) make this method totally subjective. Has EPA validated this method with a panel of 10 people?

Response:

The commenter is concerned about the ability of an observer to detect a visible fugitive emission with precision and about the effects of conditions around the observation site on the reported values. The determination of the presence of a fugitive visible emission is objective. EPA comparisons of paired observers during method development testing showed that there was a small degree of imprecision in the results. The degree of imprecision and the variables associated with Method 22 measurements were considered in setting the level of the standard, and a safety margin was included. Therefore, even with the small degree of imprecision in the method, the standard has been determined to be achievable. Validation of the method by a panel of 10 people is not considered necessary.

EPA agrees that training of a Method 22 observer regarding positioning, lighting, potential interferences (e.g., condensing water vapor), and correct documentation procedures is necessary and states this in Method 22 (Section 1). There is a distinction between training and certification. EPA sees no need for observer certification for Method 22 observations. A Method 22 observer does not need the ability to determine plume opacity, only the ability to detect the presence of visible fugitive emissions and to time the duration of these emissions. One suitable source for this type of training is the lecture portion of the visible emission schools provided by EPA and other organizations around the country. Other sources include the written material provided by EPA discussing visible emission determinations. Two such documents have been added to Method 22 as references, and Method 22 requires the observer to know this material prior to the field test.

2.12.8 Comment D-13

The commenter asks what quality assurance will be required for Method 22.

Response:

EPA feels that strict adherence to the procedures in Method 22 is sufficient quality assurance for the determination of the duration of visible fugitive emissions.

2.12.9 Comment D-6

The commenter says that the technical deficiencies of monitoring indoor fugitive emissions will be difficult to handle in any enforcement proceeding and wonders if the results will vary with the lighting, building temperature, and observer position.

Response:

Refer to Response 2.12.5 for a complete response to this comment. In brief, the potential technical problems, such as poor lighting, low contrast backgrounds, and other conditions affecting the detection of visible emissions, are addressed in Method 22. Training of the observer for awareness of these potential problems is necessary as stated in the method (Section 1). EPA is aware of these potential problems and has prepared the regulation and the method accordingly.

2.12.10 Comment D-18

The commenter states:

> Review of the proposed standard and of the Background Information Document (BID) for the visible emission standard [60.472(a)(3)] does not indicate the fugitive emissions from asphalt saturator capture systems cause a significant air quality impact, sufficient to warrant a separate standard.
>
> Method 22 for visible emission evaluation would require a significant amount of time for a regulatory agency to conduct. This time could better be spent on the emission points causing the most air quality impact. We do not believe that the effect on manpower and other resources required to enforce this standard have been sufficiently addressed. Also, observation of emissions in a building may not adequately relate to emissions which reach the outside air.
>
> We suggest that § 60.472(a)(3) and Method 22 not be required. As an alternative, we suggest that EPA give consideration to modifying this regulation so as to require each new, modified, or reconstructed saturator to be equipped with a totally enclosed hood system. Such an equipment standard should preclude the need for § 60.472(a)(3) and Method 22, and the questionable use of visible emission evaluations which may not have any significant air quality impact.

Response:

Emissions from the saturator cannot be controlled by the control device unless they are captured and delivered to the control device. Emissions that are not captured may escape the building and contribute to ambient air pollution. The fugitive emission standard (which requires manpower and resources to enforce) is necessary to ensure effective capture of the emissions. EPA believes that this requirement is reasonable. The Clean Air Act Section 111(b) states that "if, in the judgment of the Administrator, it is not feasible to prescribe or enforce a standard of performance, he may instead promulgate an equipment standard." It is feasible to prescribe and enforce a standard of performance for the fugitive emissions from the saturator enclosure because the presence or absence of emissions can be observed. Therefore, establishment of an equipment standard would not be allowed by Section 111(h) of the Clean Air Act.

2.13 CONTINUOUS BLOWING STILLS

2.13.1 Comment: D-17

The commenter recommends that continuous blowing stills be exempted from the standard until tests confirm the applicability of the standard to continuous stills. It is not clear that the particulate emissions limits specified in Section 60.472 for emissions from blowing stills (based on measurement of emissions from a single batch still) should reasonably apply to large continuous blowing stills, such as those commonly used in refineries for the production of paving asphalt. Hydrocarbon emissions from a blowing still depend upon the composition of the charge to the still and the length of time that the charge has been in the still. In batch operations, low boiling oils are stripped from the flux early in the run. In continuous oxidizers, flux is continually charged to the blowing still, and blown flux continually withdrawn. Since fresh charge is continuously added, low boiling oils are present in the emissions throughout the entire run, not only at the start of the run.

Response:

The commenter was contacted for information on continuous blowing and data on the emissions. The data furnished by the commenter (Docket No. A-79-39-IV-D-021) indicate that the uncontrolled emissions from the continuous blowing still would be about 1.65 kg/Mg (3.3 lb/ton) of asphalt charged. The uncontrolled emissions from the tested batch still were 13.5 kg/Mg (27 lb/ton) of asphalt charged. The air flow in the continuous still was 0.5 m^3/Mg (16 SCF/ton) of asphalt; the air flow in the tested batch still was 1.3 m^3/Mg (42 SCF/ton) of asphalt. The commenter states that the mass rate of emissions from a continuous still would be constant while the emission rate from the batch still would be subject to peaks. EPA believes the emissions from the continuous still will be easier and less expensive to control than emissions from a batch still. A smaller afterburner could be used to control the fume from the continuous still because the air flow is much smaller and the afterburner does not have to be sized for peak emissions. Because of the lower mass emission rate per unit of asphalt production, the afterburner would only need to attain an efficiency of about 65 percent to meet the emission limit. Low boiling oils are emitted throughout the blowing process. The owner/operator of a batch blowing still would have to run the performance test during peaks as well as valleys since he is required to measure the emissions from an entire batch. Emissions during a 90-minute period of a continuous blow would not yield any higher emissions on a kg/Mg (lb/ton) basis than a batch operation averaged over the batch. EPA believes that the afterburner will capture the low boiling oils and that the standard is achievable. Therefore, continuous blowing stills have not been exempted from meeting the standard. The owner/operator may run the performance test either during a 90-minute portion of the continuous blow cycle or during batch operation of the blowing still.

2.14 CHANGES IN ROOFING INDUSTRY MARKET

2.14.1 Comment: D-4

The commmenter states that in selection of source for control, the following statement appears: "Declines in construction of new homes have generally been offset by increasing strength in the replacement

market; thus, there has been a stable demand for roofing products." The commenter states that this has not been the case in 1980; there has been a 20 to 25 percent reduction in volume due to drops in the market for new and replacement roofs.

Response:

The commenter takes exception to the statement that the asphalt roofing market is stabilized by the replacement market, pointing out that the sales volume in both markets was down 20 to 25 percent in 1980. EPA's purpose in making the statement was to point out that the roofing market is not dramaticaly affected by the very volatile new-housing market. The data available to EPA during the development of the proposed standards indicated that new housing starts varied greatly from year to year during the 1970 to 1977 period. Over this period, housing starts varied from plus 42 percent to minus 34 percent. However, asphalt roofing shipments varied only from plus 12 percent to minus 8 percent due to the stabilizing effect of the replacement market.

The statement in the preamble referred to by the commenter was based on data from 1963 through 1977. These data show that when applied over a period of years the statement is correct. Growth projections are not based on a single years' production. The 1980 Bureau of Census data on housing construction starts and roofing sales have not yet been published.

2.15 COMMENTS ON DOCUMENT

The following comments on the background information document, "Asphalt Roofing Manufacturing Industry-Background Information for Proposed Standards," EPA-450/3-80-021a, June 1980, are as received from Commenter D-4 and concurred with by Commenter D-7. Commenter D-4 provided additional comments in a second letter (D-24). Appendix A, "Addendum to the Asphalt Roofing Manufacturing Industry-Background Information for Proposed Standards" contains the corrections and clarifications of the BID that have resulted in part from these comments.

2.15.1 Comments on Chapter 3--Asphalt Roofing Manufacturing Industry

2.15.1.1 Comment. "On the Chart, Figure 3-1, p. 3-2, it shows asbestos as a raw material for making dry felt. This is incorrect. We

recommend removal of asbestos from raw materials and add a new box under intermediate products entitled 'Asbestos Paper or Dry Felt.'"

Response:

Figure 3-1, p. 3-2, was taken from the Asphalt Roofing Manufacturers Association publication "Manufacture Selection and Application of Asphalt Roofing and Siding Products--Twelfth Edition." Asbestos is shown as a possible raw material for felt. Roofing felts are made from fibrous materials. Any fibrous material or combination of fibrous material may be used to produce felts. However, as suggested by the commenter, the use of asbestos as a raw material for roofing felts is declining.

2.15.1.2 Comment. "Throughout the text, reference is made to felts being produced from 'asbestos.' Again, this statement is incorrect. In all cases, it should read 'asbestos ply' or 'asbestos paper' as an intermediate product, not as a substance used in producing dry felt."

Response:

As shown in Appendix A, the word "asbestos" is being changed to read "asbestos paper" throughout the BID.

2.15.1.3 Comment. "In Figure 3-4, p. 3-10, there are two errors. A typical roofing plant does not enclose the coater with the saturator and, to our knowledge, a 'rotary kiln' is no longer used in the industry."

Response:

Figure 3-4, p. 3-10, was taken from the second edition of "Air Pollution Engineering Manual." Many coaters are hooded with the emissions ducted to the same control device used for emissions from the saturator. Some of the newer enclosures installed in the industry do cover the coater as well as the saturator. Therefore, we do not consider this to be an error. The corrected figure in Appendix A shows that the mineral particles for coating stabilizer are dried before being introduced into the coating asphalts without specifying the type of drying equipment used to dry the material.

2.15.2 Comment on Chapter 4--Emissions Control Techniques

"On p. 4-12, last paragraph, it is stated, 'The major disadvantages (HVAF units) are: a lack of control of gaseous emissions, the large pressure drops required . . . .' We believe the latter should read 'the

large pressure drops requiring higher energy consumption . . .' would help clarify the point."

Response:

The addendum in Appendix A reads as recommended in this comment to clarify the BID statement.

2.15.3 Comment on Chapter 5--Modification and Reconstruction

> In paragraph 5.3, on page 5-4, the statement is made that "few, if any, facilities are expected to become affected facilities by virtue of modification or reconstruction after proposal of new standards." This simply is not correct. Based on information given to the EPA earlier (December 12, 1979, meeting of National Air Pollution Control Techniques Advisory Committee, and on July 8, 1980, EPA Office of Air Quality Planning and Standards), we estimate that at least 35 of our 118 plants, and probably more, over the next 5 years will be required to comply due to either modification or reconstruction. The economic impact on the industry will be substantially greater than estimated by the EPA. A comment made later by the same commenter suggested that a reassessment of the impacts should be made.

Response:

The original EPA estimate was based on growth projections made by examining the history of the industry and the expected growth in housing construction. The information supplied by ARMA on new construction, modification, and reconstruction was considered prior to proposal and is contained in Docket No. A-79-39-II-E-013. The industry projections are as follows: 5 new medium size plants will be built; 5 small plants will be expanded to become 5 medium plants; 5 saturators will be reconstructed to replace ones destroyed by fire; and 20 saturators will be modified by increasing production from each one by 20 percent. EPA calculated the environmental, economic, and energy impacts based on the industry projection. These impacts are presented in the Federal Register (45 FR 74607-8) and were considered in evaluating the regulatory alternatives. The Administrator has determined that the economic and energy impacts are reasonable for both the original EPA estimate and the industry growth projections. No reassessment is required. It should be noted that compliance costs for the modified and reconstructed facilities will be considerably lower than the commenter anticipates due to the exemption of modified saturators from the visible emission standard.

2.15.4 Comment on Chapter 7--Environmental Impact

The entire Section from 7.1.3.1.1, beginning on p. 7-3 through p. 7-24, is new and, although we had verbal knowledge of the Section, the industry has had little opportunity to review it in any detail. Until we have had a chance to study the Dispersion Analysis, the source data, etc., we cannot comment on the accuracy of the information or the impact it will have on industry plants.

Response:

Copies of the BID were sent to industry on November 24, 1980, in time for response to the information contained in the dispersion analysis. Since the dispersion analysis is not critical to the selection of the regulatory alternatives or the emission limits but rather reflects the impact of the regulation on the ambient air quality, EPA believes the comment period provided is sufficient.

2.15.5 Comments on Chapter 8--Economic Impact, Industry Characterization

2.15.5.1 Comment. "Figure 8-1, on p. 8-3, also incorrectly describes the processing chart with reference to 'asbestos.'"

Response:

Figure 8-1, p. 8-3, was taken from the Asphalt Roofing Manufacturers Association publication "Manufacture Selection and Application of Asphalt Roofing and Siding Products--Twelfth Edition." See Response 2.15.1.1.

2.15.5.2 Comment.

On p. 8-38, the paragraph 8.1.1.5.3, Imports and Exports, states that 'The U.S. Department of Commerce publications for 1973 and 1977 do not report any imports or exports of asphalt roofing products or roofing products of any type.' This is no longer correct. In fact, the imports from Canada and Mexico of asphalt roofing materials are increasing substantially each and every month. (Please note data supplied for the record.) The U.S. producer is attempting to compete with less than fair value imports from Canada that have cost this industry an estimated $64 million in sales in the last 5 years. The information in the EPA 'backgrounder' needs to be updated.

Response:

The data supplied in the comment letter are duly reported above. These imports amount to less than 1 percent of the total industry sales for this period and will not substantially impact the economic evaluation for the standard.

2.15.5.3 Comment.

On p. 8-53, under paragraph 3, we again emphasize that the economic impact on our industry will be substantially greater than estimated by EPA. Even the EPA figures bear out our conviction in reporting 'At least half of this increased capacity can be met by the expansion of existing facilities. Several companies have indicated that they will increase the productive capacity of their plants by adding a line to make roll roofing.' If we keep up with the demands of the market place, reconstruction and modification will be necessary and, in turn, the number of plants needing to meet the proposed standards will be greater than EPA predicts. Industry estimates that it would spend approximately $22,000,000 for capital costs to comply, which is much more than the $300,000 suggested by the EPA. A comment made later by the same commenter suggested that reassessment of the impacts should be made.

Response:

The calculations for the initial environmental, economic, and energy impacts were based on the 1977 production of this industry and a projected growth rate of 1 to 2 percent per year in the 5 years following proposal of the standard. This growth was calculated to result in the production of an additional 720,000 tons of roofing by the industry, or the equivalent of three medium size model plants. The environmental, economic, and energy impacts were calculated for the construction of three new plants. The cost figures presented in the BID are the additional costs required to upgrade the plants from baseline (SIP control) to NSPS (Alternative 5). At the December 12, 1979, NAPCTAC meeting, industry representatives claimed that 55 plants would be affected by new construction, modification, or reconstruction. Industry stated that the capital cost would be $22 million (January 1980 dollars). This figure was based on the assumption that each of the 55 plants would spend $400,000 to comply with NSPS. Industry assumed that a modification or reconstruction to any facility would result in all facilities in the plant becoming subject to the NSPS, so that every plant would spend the amount required to control all facilities to the NSPS level. However, only the reconstructed or modified facility would become subject to the NSPS, and thus the compliance cost for a plant with a modified or reconstructed facility would be considerably less than the $400,000 figure predicted by industry. The compliance costs for a modified saturator would average $8,500 in

annualized costs and $20,300 in capital costs for the additional cooling systems that would be necessary to meet the NSPS. EPA's cost data indicate that an average new plant could spend $100,000 (November 1978 dollars) to bring all affected facilities into compliance with the NSPS.

During a meeting with EPA on July 8, 1980, and in a subsequent telephone conversation with EPA (Docket No. A-79-39-II-E-013), the asphalt roofing manufacturing industry representatives presented growth projections which were lower than their original estimates (see response to Comment 2.15.3). The capital cost required to move from the typical SIP to NSPS control using industry's new growth projection would be $1,300,000 (November 1978). The economic impact was calculated using the later industry estimates for the number of affected facilities and was determined to be reasonable. The calculated costs were presented in the preamble to the proposed regulation.

2.15.5.4 Comment.

> On p. 8-100, top of page, reference is made to 'heat exchanger systems (and others) require 4 hours maintenance per week, and the cyclones require 2 hours maintenance per week.' Our experience has shown that required maintenance time is much greater than mentioned. Thus, the variable costs, with the addition of pollution control devices, will once again be substantial and not as a minor item as the backgrounder suggests.

Response:

The maintenance requirements for the heat exchangers mentioned on p. 8-100 of the BID are the requirements over and above the requirements needed to meet SIP's. Therefore, the total maintenance of these devices will require more time than is shown on p. 8-100. The variable costs in the BID are the additional costs required to move from SIP control to NSPS control.

2.15.5.5 Comment. "On p. 8-122, paragraph 8.3.3, the statement, 'It was the opinion of personnel at plants visited that the impact of OSHA regulations on the industry is minimal.' We would question this general statement."

Response:

This statement refers to verbal opinions of plant personnel in the last quarter of 1978 and the first quarter of 1979 during several plant visits. These statements were confirmed in writing. The sentence has

been changed as shown in Appendix A to state ". . . at several plants visited . . . ."

2.15.5.6 Comment.

> The following statement appears on p. 8-124, paragraph 8.4.1.2, Summary: 'If this additional control cost is completely passed through to customers, it will raise the price of the product by 0.1%, a minor increase. If the control cost must be completely absorbed by the manufacturers, the profit margins of the manufacturers are such that a reduction in profit margin equivalent to 0.1% of the price will not have a major economic impact.' As expressed earlier in this letter, the industry volume in 1980 will be down 20-25% and is not expected to rise significantly in 1981. Excessive imports of Canadian shingles; the rising cost of asphalt, labor; continued increases in state and Federal taxes; transportation costs; growth of competitive products; growing capacity . . . all influence the 'pass through' of costs to customers. Further cost 'pass through' considerations have vanished. Any suggestion that the manufacturer can swallow more reduction in profit margin is unjustified, and to do so would have a major, not minor, impact on company survival.

Response:

The new source performance standard will only affect new, modified, or reconstructed facilities in this industry. The cost impacts calculated refer only to the cost associated with compliance to the NSPS.

EPA agrees that business activity is currently depressed. The influx of cheaper Canadian shingles is understandably of concern. However, since the volume of imported Canadian shingles amounts to less than one percent of domestic sales, EPA believes that the effect of Canadian shingles on the overall U.S. market is small. As the business climate improves, companies will consider capacity expansions. If, for instance, a company requires a 15 percent return on investment before considering a capital expenditure, it will be necessary to increase the "hurdle" rate to 15.1 or 15.2 percent. EPA feels that this increase will not deter a company from building a new plant, a new shingle line, or a new still, especially since new equipment is usually more efficient and cheaper to run than old equipment.

Finally, the year-to-year price increases since 1969 (BID, p. 8-39) have varied from 5.6 to 39 percent, which shows a proven history of successful cost pass through over the long term and indicates that

0.1 percent increase due to pollution control costs would not inhibit industry growth.

2.16 CONSIDERATION OF LOCATION

2.16.1 Comment: D-15

> Some consideration should be given to the location of the asphalt processing facility and the air quality existing in that area. A dispersion modeling study of the area may indicate that National Ambient Air Quality Standards (NAAQS) could be met even with emissions exceeding the proposed standards of performance for the asphalt processing industry. Climatological data for only two locations in the United States would not be fair evaluation of air quality where some remote asphalt plants are located.

Response:

The achievement of specific NAAQS is not the specific objective of Section 111 of the Clean Air Act. The overall objective of Section 111 is to improve existing air quality as older industrial sources of air pollution are replaced with new industrial sources and to prevent new pollution problems from arising.

2.17 MISCELLANEOUS

2.17.1 Comment: D-4

"The blowing still emission limit in 45 FR 76404 reads, 'Blowing still particulate emissions would be limited to 0.60 kg/Mg (1.28 lb/ton) . . .' and should read '. . . (1.20 lb/ton).'"

Response:

The commenter is correct; a typographical error was made. The number should be ". . . (1.20 lb/ton)," as was shown in 45 FR 76409.

2.17.2 Comment D-24

The commenter states that there are three changes in Section 60.474(b) that are possible mistakes. In the second sentence, the word "each" has been substituted for the word "the," and the weight value "125 lb" has been substituted for "235 lb." In the last sentence, the word "saturant" has been omitted. The substitution of the word "each" for "the" might prevent a roofing company from using one control device to control emissions from two saturator lines. The commenter suggests that Section 60.474(b) be written as in the original proposal.

Response

The weight value given in the second sentence should have read "235 lb." This error has been corrected in the standards being promulgated. The substitution of the word "each" for the word "the" was an error and has been corrected. The word "saturant" and the definition of saturant blow have been omitted to clarify that the performance test may be run while blown products other than coating and saturant asphalts are being produced.

2.17.3 Comment: D-24

The commenter makes the following requests of EPA: postpone the implementation of the standards until not earlier than June 30, 1982; seek information and invite assistance from ARMA and others in the course of the requested testing, revision, and assessment of Method 5A; and repropose on or after February 28, 1982, revised new source performance standards for asphalt processing and asphalt roofing manufacture based on the requested testing, revision, and assessment.

Response

No information has been furnished to support postponing the implementation of the standards. EPA does not see the necessity to conduct a new series of emission tests using Test Method 5A. The advice and assistance of ARMA and others in the industry was solicited and relied upon throughout the decision-making process. EPA does not believe there is any reason to postpone promulgation.

2.17.4 Comment D-23

The commenter states that his earlier comments (comment letter D-13) are still applicable. (This second letter (D-23) was received during the public comment period following publication of the proposed amendment).

Response

No response needed.

2.17.5 Comment: D-8

The commenter states he has reviewed the proposed rulemaking on new source performance standards for asphalt processing and asphalt roofing manufacture and has no comments.

Response:

No response needed.

APPENDIX A. ADDENDUM TO ASPHALT ROOFING MANUFACTURING INDUSTRY BACKGROUND INFORMATION FOR PROPOSED STANDARDS (EPA 450/3-80-021a)

On page 3-1 of the Background Information Document, the statement, "Felt can also be made from asbestos," has been changed to read, "A product called asbestos paper may also be produced." On page 3-5 the word "asbestos" has been removed from the sentence reading "Felts are produced from saw dust . . . asbestos."

Figure 3-4 has been changed to remove the rotary kiln for drying mineral dust and to substitute a mineral dryer for this process.

On page 4-12 the sentence "The major disadvantages are: . . . the large pressure drops required . . ." has been changed to read: "The major disadvantages are: . . . the large pressure drops requiring higher energy consumption . . . ."

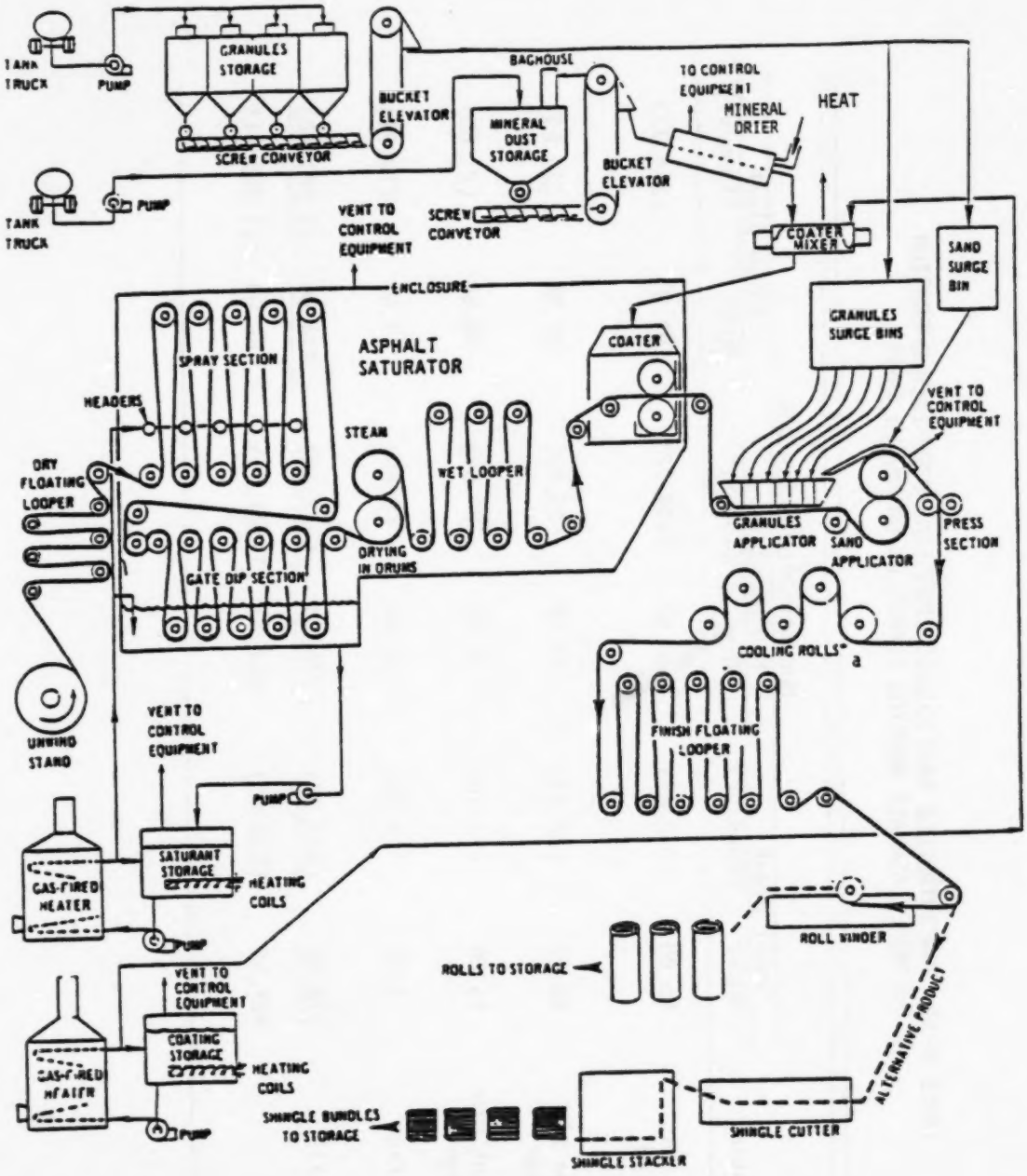
On page 5-4 the sentence, "According to 40 CFR Part 60 . . . few, if any facilities are expected to become affected facilities by virtue of modification or reconstruction . . ." has been changed to read: ". . . several facilities are expected to become affected facilities because of modifications to increase production and reconstruction to replace staturators destroyed by fire."

On page 7-30 the number ". . . (4,320 barrels/yr) . . . "should be changed to ". . . (3,800 barrels/yr) . . . ."

Tables 8-34 amd 8-35 have been changed to correct the emissions from asphalt storage tanks. Table 8-45 has been changed to correct the annualized costs for the medium-sized plant.

On page 8-122 the sentence, "It was the opinion of personnel at plants visited that the impact of OSHA regulations on the industry is minimal," has been changed to read: "It was the opinion of personnel at several plants visited . . . ."

Tables C-3 and C-3a have been changed to correct the total concentration and total emission rates. Table C-19a has been changed to correct the lb/ton of particulate at the A/B inlet of run No. 4.



a* WATER SPRAY USED ALSO. THIS IS FOLLOWED BY "SEAL-DOWN" STRIP APPLICATION.

Figure 3-4. Typical flow sheet for manufacturing shingles and rolls.[12]

TABLE 8-34. UNCONTROLLED PARTICULATE EMISSIONS FROM EACH OPERATION AT THE MODEL ASPHALT ROOFING PLANTS ON AN ANNUAL BASIS

Plant operation	Uncontrolled emissions					
	Small plant		Medium plant		Large plant	
	Mg/yr	(tons/yr)	Mg/yr	(tons/yr)	Mg/yr	(tons/yr)
Saturator, wet looper, and coater	65.89	(72.63)	130.82	(144.22)	194.81	(214.77)
Filler surge bin and storage	20.53	(22.63)	27.06	(29.83)	27.06	(29.83)
Parting agent bin and storage	13.06	(14.40)	19.60	(21.60)	19.60	(21.60)
Asphalt storage tanks	4.40	(4.85)	8.90	(9.80)	11.08	(12.21)
Blowing stills	378.00	(417.00)	746.00	(822.40)	944.00	(1,041.00)
Totals	481.88	(531.51)	932.38	(1,027.85)	1,168.00	(1,288.01)

TABLE 8-35. UNCONTROLLED PARTICULATE EMISSIONS, CONTROL EMISSIONS, AND PARTICULATE POLLUTANTS COLLECTED FOR EACH MODEL ASPHALT ROOFING PLANT OPERATION AND POLLUTION CONTROL DEVICE

operation and size	Description of control system					Uncontrolled emissions		Controlled emissions		Pollutants collected	
	Device(s)	Nm^3/s	(scfm)	°C	(°F)	Mg/yr	(tons/yr)	Mg/yr	(tons/yr)	Mg/yr	(tons/yr)
Saturator, wet looper, and coater											
Small	ESP/HE[a]	4.93	(10,450)	38	(100)	65.89	(72.63)	4.39	(4.84)	61.50	(67.79)
	HVAF/HE[b]	4.93	(10,450)	38	(100)	65.89	(72.63)	4.39	(4.84)	61.50	(67.79)
	A/B W/HR[c]	4.93	(10,450)	760	(1400)	65.89	(72.63)	4.39	(4.84)	61.50	(67.79)
	ESP/HE	9.79	(20,750)	38	(100)	130.82	(144.22)	8.78	(9.68)	122.04	(134.54)
Medium	HVAF/HE	9.79	(20,750)	38	(100)	130.82	(144.22)	8.78	(9.68)	122.04	(134.54)
	A/B W/HR	9.79	(20,750)	760	(1400)	130.82	(144.22)	8.78	(9.68)	122.04	(134.54)
	ESP/HE	14.58	(30,900)	38	(100)	194.82	(214.77)	11.25	(12.40)	183.57	(202.37)
Large	HVAF/HE	14.58	(30,900)	38	(100)	194.82	(214.77)	11.25	(12.40)	183.57	(202.37)
	A/B W/HR	14.58	(30,900)	760	(1400)	194.82	(214.77)	11.25	(12.40)	183.57	(202.37)
Filler surge bin and storage											
Small	CYC[d]	1.04	(2,200)	Ambient		20.53	(22.63)	4.10	(4.52)	16.43	(18.11)
	F/F[e]	1.04	(2,200)	Ambient		20.53	(22.63)	0.33	(0.36)	20.20	(22.27)
Medium and Large	CYC	1.37	(2,900)	Ambient		27.06	(29.83)	5.41	(5.96)	21.65	(23.87)
	F/F	1.37	(2,900)	Ambient		27.06	(29.83)	0.44	(0.48)	26.63	(29.35)
Parting agent bin and storage											
Small	CYC	0.66	(1,400)	Ambient		13.06	(14.40)	2.61	(2.88)	10.45	(11.52)
	F/F	0.66	(1,400)	Ambient		13.06	(14.40)	0.21	(0.23)	12.85	(14.17)
Medium	CYC	0.99	(2,100)	Ambient		19.60	(21.60)	3.97	(4.38)	15.62	(17.22)
Large	F/F	0.99	(2,100)	Ambient		19.60	(21.60)	0.32	(0.35)	19.29	(21.25)
Asphalt storage											
Small	M/E[f]	0.21	(450)	54	(130)	4.40	(4.85)	0.09	(0.10)	4.31	(4.75)
Medium	M/E	0.35	(740)	54	(130)	8.90	(9.80)	0.18	(0.20)	8.72	(9.60)
Large	M/E	0.425	(900)	54	(130)	11.08	(12.21)	0.22	(0.24)	10.86	(11.97)

[a] ESP/HE = electrostatic precipitator with cooling system.
[b] HVAF/HE = high velocity air filter with cooling system.
[c] A/B W/HR = afterburner with heat recovery.
[d] CYC = cyclone.
[e] F/F = fabric filter.
[f] M/E = mist eliminator.

TABLE 8-45. INCREASE IN ANNUALIZED COSTS OF POLLUTION CONTROL SYSTEMS FOR ALTERNATIVES 2 TO 5 COMPARED TO THE BASELINE POLLUTION CONTROL SYSTEMS

Plant size	Plant configuration	Saturator control device	Increase in annualized costs (November 1978 dollars)[a,b]							
			Alternative 2		Alternative 3		Alternative 4		Alternative 5	
			$	%	$	%	$	%	$	%
Small	1	ESP[c]	16,200	14.1	29,300	25.4	25,200	21.9	38,300	33.3
	1	HVAF[d]	16,400	13.5	29,500	24.2	25,400	20.9	38,500	31.6
	1	A/B W/HR[e]	51,800	27.6	64,900	34.6	60,800	32.4	73,900	39.4
	2	ESP	16,200	25.3	16,200	25.3	25,200	39.4	25,200	39.4
	2	HVAF	16,400	23.4	16,400	23.4	25,400	36.0	25,400	36.0
	2	A/B W/HR	51,800	38.0	51,800	38.0	60,800	44.6	60,800	44.6
Medium	1	ESP	27,000	15.0	52,200	29.0	36,400	20.2	61,600	34.2
	1	HVAF	27,100	14.0	52,300	27.0	36,500	18.8	61,700	31.8
	1	A/B/ W/HR	98,000	30.2	123,200	38.0	107,400	33.1	132,600	40.9
	2	ESP	27,000	22.4	27,000	22.4	36,400	33.2	36,400	33.2
	2	HVAF	27,100	20.3	27,100	20.3	36,500	29.5	36,500	29.5
	2	A/B W/HR	98,000	37.2	98,000	37.2	107,400	42.2	107,400	42.2
Large	1	ESP	36,300	14.2	66,900	26.2	45,700	17.9	76,300	29.8
	1	HVAF	35,800	13.0	66,400	24.2	45,200	16.5	75,800	27.6
	1	A/B W/HR	141,300	30.2	171,900	36.7	150,700	32.2	181,300	38.7
	2	ESP	36,300	20.1	36,300	20.1	45,700	26.1	45,700	26.1
	2	HVAF	35,800	18.5	35,800	18.5	45,200	23.3	45,200	23.3
	2	A/B W/HR	141,300	36.5	141,300	36.5	150,700	38.9	150,700	38.9

[a] Net annualized costs are the sum of annual variable and fixed operating costs less recovery credits.
[b] The increase in annualized cost as a percentage of the total baseline annualized cost.
[c] ESP = electrostatic precipitator.
[d] HVAF = high velocity air filter.
[e] A/B W/HR = afterburner with heat recovery.

TABLE C-3. PARTICULATE POLYCYCLIC ORGANIC MATTER CONCENTRATION AND EMISSION DATA SUMMARY--PLANT A (OCTOBER 9, 1975) (METRIC)

Sampling location	Inlet (TP-1)	(Sampled stack) Outlet (TP-3)	Outlet (TP-2)[a] estimated value	Combined total flow conditions for outlet stacks
Volume of gas sampled--Nm^3[b]	2.25	2.81	--	--
Percent moisture by volume	2.1	2.2	2.2	2.2
Average stack temperature--°C	58.3	58.9	58.9	58.9
Stack volumetric flow rate--Nm^3/s[c]	12.47	5.67	6.07	11.74
Stack volumetric flow rate--m^3/s[d]	14.45	6.57	7.05	13.62
Percent isokinetic	106.7	99.7	--	--

Particulate--POM Sampling location	μg		Concentration $kg/m^3 \times 10^{-9}$		Emission rate $kg/s \times 10^{-7}$	
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet (TP-2+TP-3)[a]
Component						
Anthracene/Phenanthrene	51.2	44.8	22.70	15.90	2.83	1.86
Methyl anthracenes	181.8	102.2	80.55	36.16	10.04	4.25
Fluroanthene	0.950	6.25	0.41	2.22	0.05	0.26
Pyrene	7.40	2.90	3.27	1.03	0.40	0.12
Methyl pyrene/Fluoranthene	4.00	20.9	1.78	7.41	0.23	0.87
Benzo(c)phenanthrene	0.350	Not detected	0.156	ND[e]	0.02	ND
Chrysene/Benz(a)anthracene	8.30	0.700	3.68	0.25	0.45	0.029
Methyl chrysenes	21.8	0.350	9.66	0.12	1.21	0.015
Benzo fluoranthenes	5.30	0.350	2.36	0.12	0.29	0.015
Benz(a)pyrene[f] / Benz(e)pyrene	13.5	0.900	6.00	0.32	0.74	0.04
Totals	294.6	179.4	(13.07)	(6.36)	16.25	7.46
Collection efficiency, percent	--		--		54.1	

[a] Average Nm^3 at TP-2 outlet stack during four particulate tests was 6.6 percent higher than flow from TP-3 stack. m^3/s was 6.9 percent higher. These values were used to estimate total outlet flow.
[b] Normal cubic meters at 21.1°C, 101.7×10^3 Pa.
[c] Normal cubic meters per second at 21.1°C, 101.7×10^3 Pa.
[d] Actual cubic meters per second.
[e] ND=No data.
[f] Benz(a)pyrene and Benz(e)pyrene analysis combined and reported as one value.

TABLE C-3a. PARTICULATE POLYCYCLIC ORGANIC MATTER CONCENTRATION AND EMISSION DATA SUMMARY--PLANT A (OCTOBER 9, 1975) (ENGLISH)

Sampling location	Inlet (TP-1)	(Sampled stack) Outlet (TP-3)	Outlet (TP-2)[a] estimated value	Combined total flow conditions for outlet stacks
Volume of gas sampled--DSCF[b]	79.48	99.30	--	
Percent moisture by volume	2.1	2.2	2.2	2.2
Average stack temperature--°F	137	138	138	138
Stack volumetric flow rate--DSCFM[c]	26,416	12,009	12,858	24,867
Stack volumetric flow rate--acfm[d]	30,625	13,914	14,946	28,860
Percent isokinetic	106.7	99.7	--	

Particulate--POM	μg		Concentration (gr/DSCFx10^{-6})		Emission rate (lb/hx10^{-3})	
Sampling location	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet (TP-2+TP-3)[a]
Component						
Anthracene/Phenanthrene	51.2	44.8	9.92	6.95	2.25	1.48
Methyl anthracenes	181.8	102.2	35.2	15.8	7.97	3.37
Fluroanthene	0.950	6.25	0.18	0.97	0.04	0.21
Pyrene	7.40	2.90	1.43	0.45	0.32	0.096
Methyl pyrene/Fluoranthene	4.00	20.9	0.78	3.24	0.18	0.69
Benzo(c)phenanthrene	0.350	Not detected	0.068	ND[e]	0.015	ND
Chrysene/Benz(a)anthracene	8.30	0.700	1.61	0.11	0.36	0.023
Methyl chrysenes	21.8	0.350	4.22	0.054	0.96	0.012
Benzo fluoranthenes	5.30	0.350	1.03	0.054	0.23	0.012
Benz(a)pyrene[f] / Benz(e)pyrene	13.5	0.900	2.62	0.14	0.59	0.030
Totals	294.6	179.4	5.71x10^{-6}	2.78x10^{-6}	12.9x10^{-3}	5.92x10^{-3}
Collection efficiency, percent	--		--		54.1	

[a] Average DSCFM at TP-2 outlet stack during four particulate tests was 6.6 percent higher than flow from TP-3 stack. acfm was 6.9 percent higher. These values were used to estimate total outlet flow.
[b] Dry standard cubic feet at 70°F, 29.92 in. Hg.
[c] Dry standard cubic feet per minute at 70°F, 29.92 in. Hg.
[d] Actual cubic feet per minute.
[e] ND=No data.
[f] Benz(a)pyrene and Benz(e)pyrene analysis combined and reported as one value.

TABLE C-19a. PERFORMANCE SUMMARY OF EMISSION REDUCTION SYSTEM FOR BLOWING STILLS COATING BLOWS--PLANT E (ENGLISH)

Run number	3		4		5		Average	
Date	8-21-75		8-22-75		8-24-75			
Stack conditions								
Sample location	A/B inlet	A/B outlet	A/B inlet	A/B outlet	A/B inlet	A/B outlet	A/B inlet	A/B outlet
Sample number	B-5	B-6	B-7	B-8	B-9	B-10	--	--
Volumetric flow rate--DSCFM	1,838	9,045	1,943	9,549	1,881	8,524	1,887	9,039
Stack temperature--°F	419	391	430	382	411	382	420	385
Moisture--vol. %	33.6	15.6	33.9	15.0	34.9	16.5	34.1	15.7
Production rates								8.9 tons/h
Particulates--probe, upstream impingers, prefilter, filter,								
gr/DSCF	15.06	0.123	15.42	0.066	14.41	0.099	14.60	0.096
lb/h	210.8	9.0	299.3	5.4	212.1	7.1	217.4	7.2
lb/ton							24.42	0.81
Afterburner efficiency, percent								
This run	95.7		97.6		96.7			
Average, three runs			96.7					
Gaseous hydrocarbons								
ppm as CH_4	6,420	69.2	7,066	103.3	6,100	21.7	6,506	64.7
gr/DSCF	1.894	0.020	2.084	0.030	1.799	0.066	1.919	0.019
lb/h	28.83	1.57	33.73	2.49	28.75	0.46	30.44	1.51
Afterburner efficiency, percent								
This run	94.6		92.6		98.4			
Average, three runs			95.2					